ORDER NO. KM79910324A2

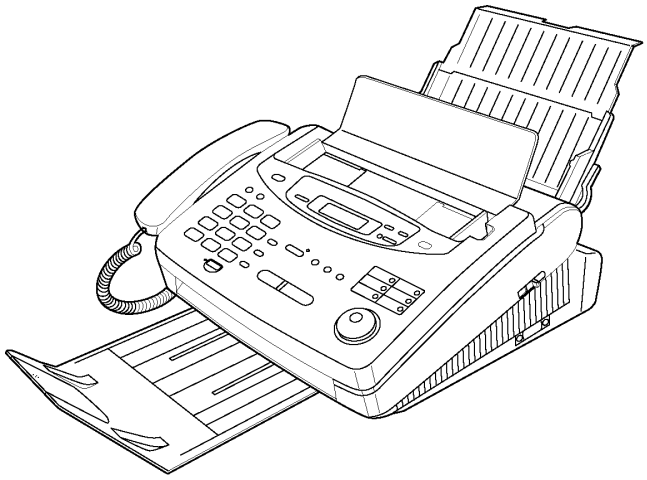
Service Manual

Multi-Function Plain Paper FAX

KX-FM330GR

(for Greece)

Simplified



Please file and use this manual together with the service manual for Model No. KX-FP320G/KX-FM330G, Order No.KM79908300C2. This Service Manual indicates the main differences between; Original KX-FP320G/KX-FM330G and KX-FM330GR.

IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These parts are marked by ⚠ in the Schematic Diagrams, Circuit Board Diagrams, Exploded Views and Replacement Parts List. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire or other hazards. Do not modify the original design without permission of manufacturer.

Notice the PC interface-related features for KX-FM330 model (marked with "KX-FM330 only" in the original Service Manual).

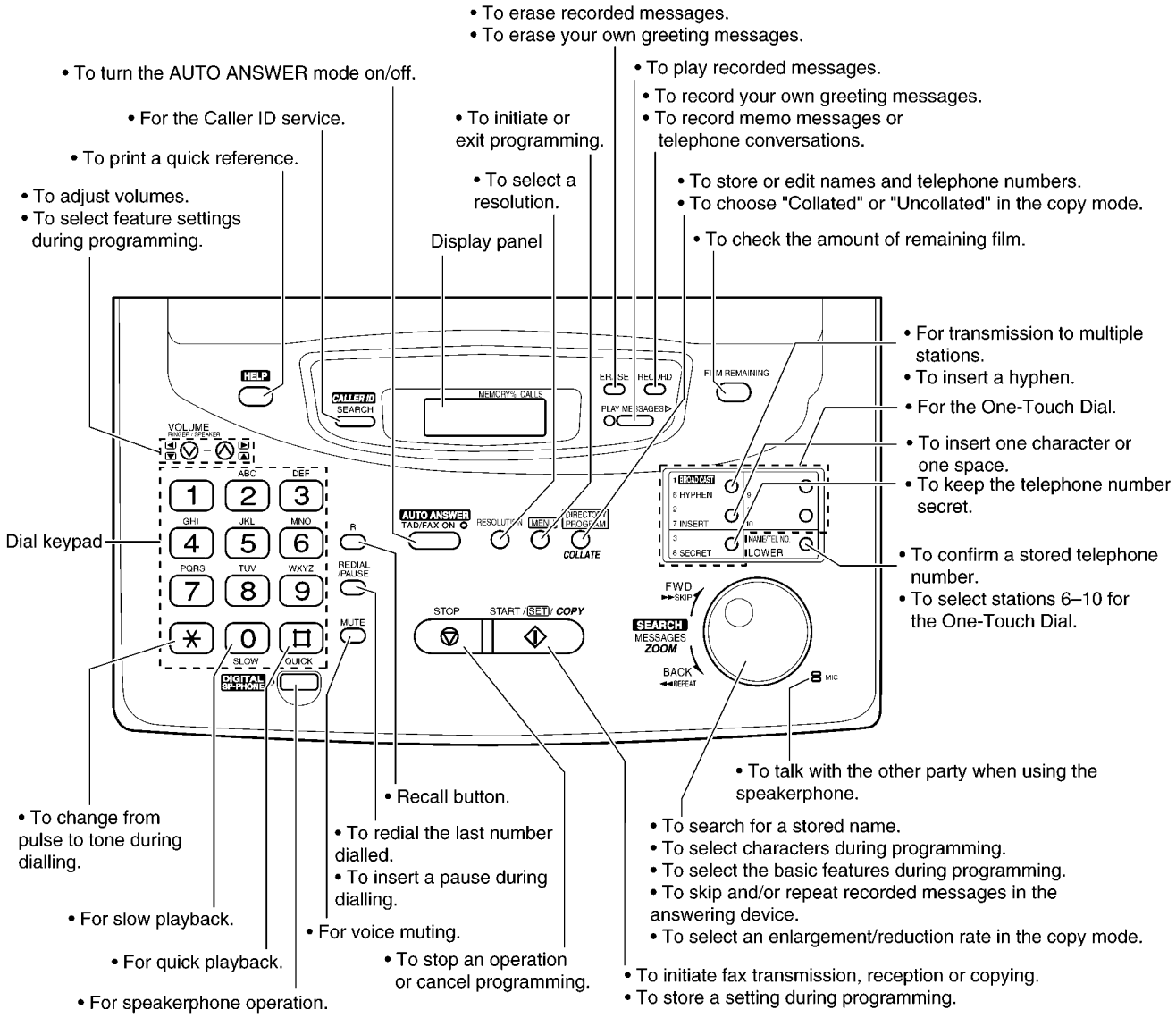
Panasonic®

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1 INTRODUCTION

1.1. CONTROL PANEL

Change from original page 10 (**1.12.2 CONTROL PANEL**)



1.2. CONNECTIONS

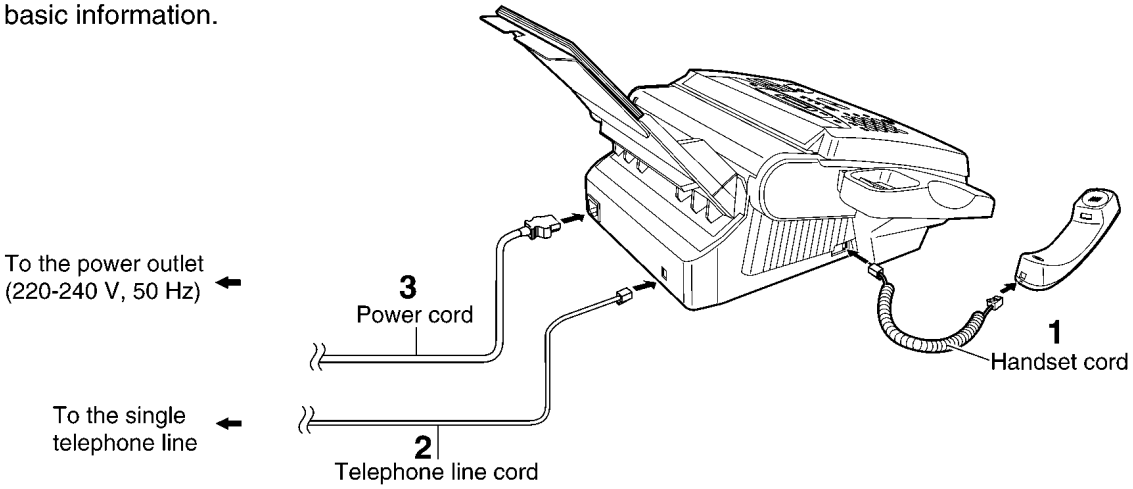
Change from original page 11 (**1.13. CONNECTIONS**)

1 Connect the handset cord.

2 Connect the telephone line cord.

3 Connect the power cord.

- When the power is turned on for the first time, the unit will print some basic information.



Note:

- When you operate this product, the power outlet should be near the product and easily accessible.
- If the following message is displayed when the unit is plugged in, the recording paper set lever will be released.

Display: CHECK LEVER

Move the lever back.

1.3. TO SELECT CHARACTERS WITH THE DIAL KEYPAD

Change from original page 19 (**1.14.7. TO SELECT CHARACTERS WITH THE DIAL KEYPAD**)

Pressing the dial keys will select a character as shown below.

Keys	Characters
1	1 [ ] { } + − / = , . _ ' : ; ? ¡
2	A B C a b c 2
3	D E F d e f 3
4	G H I g h i 4
5	J K L j k l 5
6	M N O m n o 6
7	P Q R S p q r s 7
8	T U V t u v 8
9	W X Y Z w x y z 9
0	0 ( ) < > ! " # $ % & ¥ * @ ^ ' →
1	**HYPHEN** key (To insert a hyphen.)
2	**INSERT** key (To insert a one character or one space.)
STOP	**Delete** key (To delete a character.)
◀	◀ key (To move the cursor to the left.)
▶	▶ key (To move the cursor to the right.) To enter another character using the same number key, move the cursor to the next space.

Note: A hyphen entered in a telephone number is counted as two digits.

2 TROUBLESHOOTING GUIDE

2.1. Program Mode Table

Change from original pages 65~66 (**2.3.3.3.2. Remote programming**)

Code	Function	Set Value	Default	Remote Setting
001	Set date and time	dd/mm/yy hh:mm **AM/PM**	(01/Jan/99)	NG
002	Your logo	---------	---------	NG
003	Your telephone number	---------	(None)	NG
004	Transmission report mode	1:Error / 2:ON **/ 3:OFF**	ERROR	OK
006	FAX ring count	**2**~4	2	NG
	TAD/FAX ring count	**2**~4/TOLL SAVER/RINGER OFF	2	NG
	Not available in TEL/FAX	---------	VOX	NG
010	Recording time	**5MIN, 1MIN**	**5MIN**	OK
011	Remote **TAD** ID	---------	ID=111	NG
014	PC link	1:ON / 2:OFF	ON	OK
015	Memory XMT	1:ON / 2:OFF	OFF	OK
022	Auto journal print	1:ON / 2:OFF	ON	OK
023	Overseas mode	ON / OFF	OFF	NG
025	Delayed transmission	ON / OFF	OFF	NG
026	Auto caller ID list	1:ON / 2:OFF	ON	OK
030	Silent FAX recognition ring	3 to 6 rings	3	OK
036	Rx reduction	1:92% / 2:86% / 3:72% / 4:100%	92%	OK
039	LCD contrast	1:NORMAL / 2:DARKER	NORMAL	OK
041	Remote FAX activation code	1:ON / 2:OFF	ON / ID=*9	NG
042	Message alert	1:ON / 2:OFF	OFF	OK
043	REC. time alert	1:ON / 2:OFF	OFF	OK
044	Receive alert	1:ON / 2:OFF	ON	OK
045	**LINE MODE**	**CO / PBX**	**CO**	**OK**
046	Friendly rcv.	1:ON / 2:OFF	ON	OK
047	Voice guidance	**1:ERROR / 2:ON / 3:OFF**	ON	OK
054	Common greeting MSG. REC. time	1:16s / 2:60s	16s	OK
060	**Message transfer**	**1:MESSAGE 2:PAGER 3:OFF**	OFF	OK
061	**Transfer greeting**	**CHECK / RECORD / ERASE**	**CHECK**	NG
067	Setting the ICM monitor	1:ON / 2:OFF	ON	OK
068	ECM Communication	1:ON / 2:OFF	ON	OK
070	**FAX PAGER CALL**	**ON / OFF**	**OFF**	**NG**
076	FAX tone	1:ON / 2:OFF	ON	OK
077	Auto answer mode	1:**TAD**/FAX 2: FAX **ONLY** 3: TEL/FAX	**TAD**/FAX	OK
078	TEL/FAX delayed ring	**2** to **4** rings	2	OK
079	Film detection	1:ON / 2:OFF	ON	OK
080	Set default	YES / NO	NO	NG
501	Pause time set	001~600 x 100msec	**050**	OK
502	Flash time set	01~99 x 10msec	**12**	OK
510	**VOX time**	**1:6sec / 2:4sec**	**4sec**	**OK**
520	CED frequency select	1:2100Hz / 2:1100Hz	2100	OK
521	International mode select	1:ON / 2:OFF	**ON**	OK
522	Auto standby select	1:ON / 2:OFF	ON	OK
523	Receive equalizer select	1:0.0km / 2:1.8km / 3:3.6km / 4:7.2km	0km	OK
524	Transmission equalizer select	1:0.0km / 2:1.8km / 3:3.6km / 4:7.2km	0km	OK
533	**Setting the number of times that message transfer is redialed**	**00~99**	**03**	**OK**
534	**Setting the message transfer / pager call redial interval**	**001~999**	**065**	**OK**
550	Memory clear	---------	---------	NG
551	ROM check	---------	---------	NG
552	DTMF signal tone test	1:ON / 2:OFF	OFF	NG
553	Monitor on FAX communication select	1:OFF / 2:Phase B / 3:ALL	OFF	OK
554	Modem test	---------	---------	NG
555	Scanner test	---------	---------	NG
556	Motor test	---------	---------	NG
557	LED test	---------	---------	NG
558	LCD test	---------	---------	NG
559	Document jam detection select	1:ON / 2:OFF	ON	OK
561	Key test	---------	---------	NG

Code	Function	Set Value	Default	Remote Setting
571	ITS auto redial time set	00~99	**03**	OK
572	ITS auto redial line disconnection time set	001~999	**065**	OK
573	Remote turn-on ring number set	01~99	**15**	OK
576	**K break detect**	**1:ON / 2:OFF**	**OFF**	**OK**
580	TAM continuous tone detection	1:ON / 2:OFF	ON	OK
590	FAX auto redial time set	00~99	**03**	OK
591	FAX auto redial line disconnection time set	001~999	**065**	OK
592	CNG transmit select	1:OFF / 2:ALL / 3:AUTO	ALL	OK
593	Time between CED and 300 bps	1:75ms / 2:500ms / 3:1sec	75ms	OK
594	Overseas DIS detection select	1:1st / 2:2nd	1st	OK
595	Receive error limit value set	**001~999**	**100**	OK
596	Transmit level set	-15~00dBm	**-8**	OK
598	Receiving Sensitivity	-20~48dBm	-44	OK
624	AT ring time out	1:3sec 2:5sec	**3**sec	OK
711	**TONE/PULSE selector**	**1:TONE 2:PULSE**	**PULSE**	**OK**
717	Transmit speed select	1:14400 / 2:12000 / 3:9600 / 4:7200 / 5:4800 / 6:2400	14400bps	OK
718	Receive speed select	1:14400 / 2:12000 / 3:9600 / 4:7200 / 5:4800 / 6:2400	14400bps	OK
719	Ringer off in TEL/FAX mode	1:ON / 2:OFF	ON	OK
721	Pause tone detect	1:ON / 2:OFF	**ON**	OK
722	Redial tone detect	1:ON / 2:OFF	ON	OK
724	PC-FAX ATD BUSY TONE DETECT	1:ON / 2:OFF	ON	OK
731	**CPC mode**	**1:A / 2:B / 3:OFF**	**A**	**OK**
732	**Auto disconnect cancel time**	**1:350ms / 2:1800ms / 3:OFF**	**350ms**	**OK**
745	Power ON film feed	1:ON / 2:OFF	ON	OK
763	CNG detect time for friendly reception	1:10s / 2:20s / 3:30s	30s	OK
771	T1 timer	1:35s / 2:60s	35s	OK
775	Monitoring of message transfer	1:ON / 2:OFF	OFF	OK
815	Sensor & VOX test	---------	---------	NG
852	Print test pattern	---------	---------	NG
853	Top margin	1~9	---------	OK
854	Left margin	1~8	---------	OK
861	A4 size set	1:ON / 2:OFF	ON	OK
880	Special service journal	1:Start	---------	OK
890	TEL/FAX ring back tone	1:ON / 2:OFF	ON	OK
895	TEL/FAX Receive mode	1:TAD/FAX / 2:FAX	FAX	OK
991	Setup list	1:Start	---------	OK
994	Journal list	1:Start	---------	OK
999	Service list	1:Start	---------	OK

OK means "can set".

NG means "can not set".

2.2. Analog Board Section

Change from original page 81 (**2.3.3.5. Analog Board Section**)

This chapter provides the testing procedures required for the analog parts. A signal route to be tested is determined depending upon purposes. For example, the handset TX route begins at the handset microphone and the signal is output to the telephone line. The signal mainly flowing on this route is analog. You can trace the signal with an oscilloscope. The signal flow on each route is shown in the Check Sheet here. If you find a specific problem in the unit, for example if you cannot communicate with the H/S, trace that signal route locally with the following Check Sheet and locate the faulty point.

CHECK SHEET

(SYMPTOM) ITEMS TO CHECK	Signal IN → ROUTE → OUT
SP-PHONE Tx	MIC-R110-C79-IC5(51-71)-C145-CN7(7)-{CN501(7)-R707-R913-C930-IC505(36-69)-C941-C805-R806-IC803(2-1)-C942-CN501(10)}-CN7(10)-C126-R159-IC5(73-63)-C53-R73-IC10(2-1)-C37-R58-R57-T1-TEL LINE
SP-PHONE Rx	TEL LINE-T1-R59-C44-IC10(6-7)-**J33**-C56-C59-R85-R89-C64-IC2(1-2)-C68-CN7(9)-{CN501(9)-C701-IC801(3-4)-C943-J604-C603-IC505(60-47)-C925-R912-R708-CN501(8)}-CN7(8)-C127-R160-IC5(75-41)-C100-R139-IC5(40-38)-C91-R132-IC3(4-5,8)-SPEAKER
Handset Tx	MIC-L35-R135-C94-IC5(52,54-63)-C53-R73-IC10(2-1)-C37-R58-R57-T1-TEL LINE L38-R134-C93
Handset Rx	TEL LINE -T1-R59-C44-IC10(6-7)-**J33**-C56-C57-R80-R150-C113-IC5(59-45,56)
Greeting for TEL LINE MSGS for TEL LINE	C84-L37-SPEAKER L36
DTMF monitor – Speaker	{IC505(47)-C925-R912-R708-CN501(8)}-CN7(8)-C127-R160-IC5(75-41)-C100-R139-IC5(40-38)-C91-R132-IC3(4-5,8)-Speaker
DTMF monitor – Handset	{IC505(69)-C941-C805-R806-IC803(2-1)-C942-CN501(10)}-CN7(10)-C126-R155-IC5(76-45,46)
Greeting for TEL LINE MSGS for TEL LINE	C84-L37-Speaker L36
DTMF for TEL LINE FAX Tx	{IC505(69)-C941-C805-R806-IC803(2-1)-C942-CN501(10)}-CN7(10)-C126-R159-IC5(73-63)-C53-R73-IC10(2-1)-C37-R58-R57-T1-TEL LINE
(TONE 1) Dummy Ring Back tone and TAM Beep to Line	{IC501(38)-R567-R573-C564-CN501(11)}-CN7(11)-R161-C119-IC5(77-63)-C53-R73-IC10(2-1)-C37-R58-R57-T1-TEL LINE
(TONE 1) RINGING Alarm / Beep / Key tone	{IC501(38)-R567-R573-C564-CN501(11)}-CN7(11)-R161-C119-IC5(77-41)-C100-R139-IC5(40-38)-C91-R132-IC3(4-5,8)-SPEAKER
FAX Rx ICM Rec	TEL LINE-T1-R59-C44-IC10(6-7)-**J33**-C56-C59-R85-R89-C64-IC2(1-2)-C68-CN7(9)-{CN501(9)-C701-IC801(3-4)-C943-J604-C603-IC505(60)}
CNG / DTMF (OFF Hook) VOX DETECTION FAX Rx	TEL LINE-T1-R59-C44-IC10(6-7)-**J33**-C56-C59-R85-R89-C64-IC2(1-2)-C68-CN7(9)-{CN501(9)-C701-IC801(3-4)-C943-J604-C603-IC505-(60)}
Greeting / MEMO Rec	MIC-R110-C79-IC5(51-71)-C145-CN7(7)-{CN501(7)-R707-R913-C930-IC505(36)
Caller ID DTMF detection (ON Hook)	TEL LINE-T2-C115-R154-IC5(61-67)-R167-C134-IC2(10-11)-C68-CN7(9)-{CN501(9)-C701-IC801(1-2)-J606-C807-R808-IC803(6-7)-C948-IC801(11-10)-J604-C603-IC505(60)}

Note:

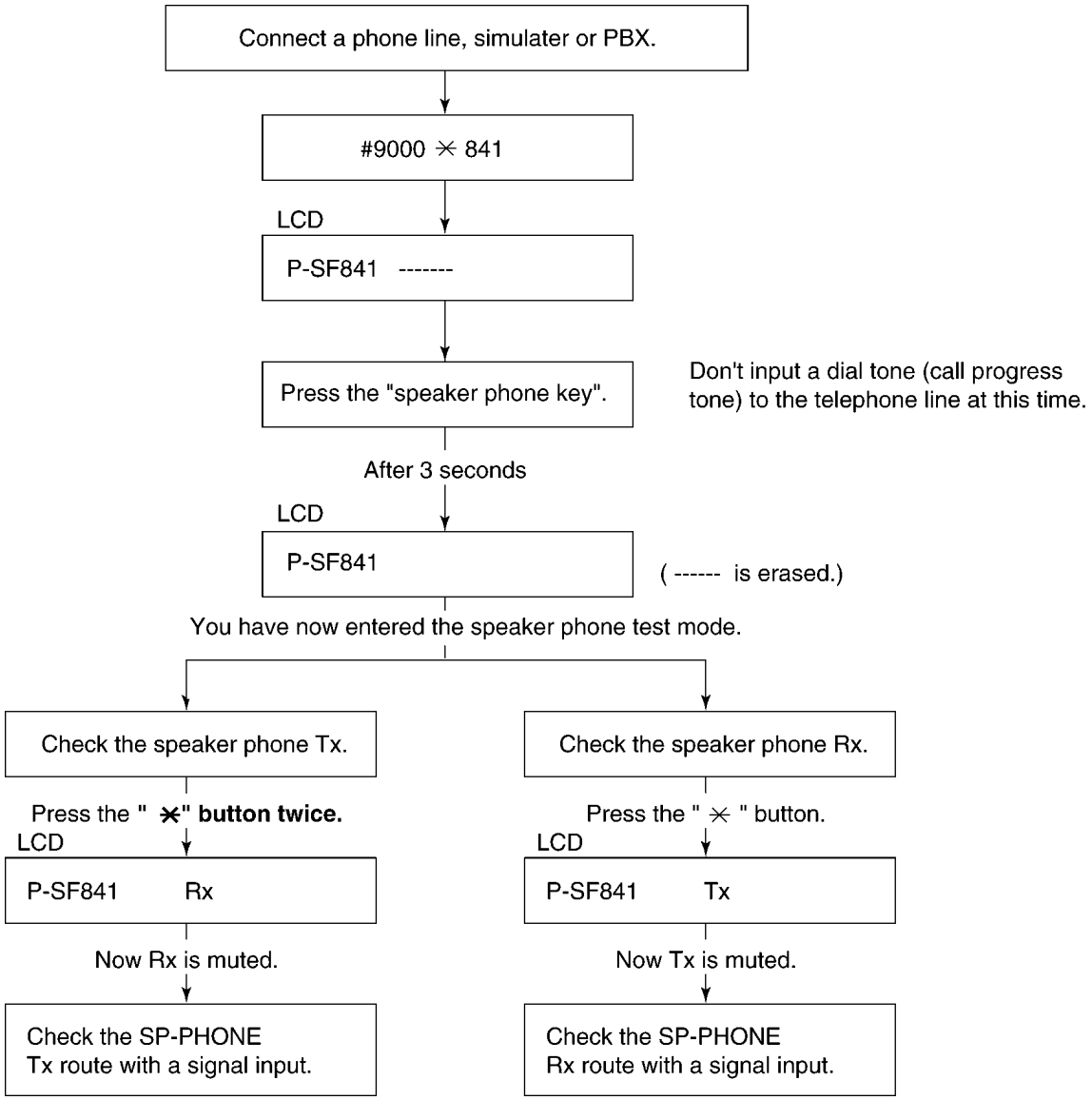
{ }: digital board

2.3. Digital Speaker Phone

Change from original page 84 (**2.3.3.5.1. Digital Speakerphone**)

HOW TO USE THE **841** SERVICE FUNCTION for THE DIGITAL SPEAKER PHONE

Please check by using the service function #9000 ✳ 841.



2.4. USER MODE (The list below is an example of the SYSTEM SETUP LIST the unit prints out.)

Change from original page 103 (**2.4.3. USER MODE**)

SETUP LIST

[BASIC FEATURE LIST]

NO.	FEATURE	CURRENT SETTING	
#01	SET DATE & TIME	Jan. 01 1999 12:01AM	
#02	YOUR LOGO		
#03	YOUR FAX NUMBER		
#04	PRINT SENDING REPORT	ERROR	[ERROR,ON,OFF]
#06	TAD/FAX RING COUNT	2	[2...4,TOLL SAVER,RINGER OFF]
#10	RECORDING TIME	5 MIN	[5MIN,1MIN]
#11	REMOTE TAD ID	ID = 111	
#14	PC LINK	ON	[ON,OFF]
#15	SEND BY MEMORY	OFF	[ON,OFF]

[ADVANCED FEATURE LIST]

NO.	FEATURE	CURRENT SETTING	
#22	JOURNAL AUTO PRINT	ON	[ON,OFF]
#23	OVERSEAS MODE	OFF	[ON,OFF]
#25	DELAYED TRANSMISSION	OFF	[ON,OFF]
	DESTINATION =		
	START TIME =	12:00AM	
#26	AUTO CALLER ID LIST	ON	[ON,OFF]
#30	SILENT FAX RECOGNITION RING	3	[3...6]
#36	RCV REDUCTION	92%	[72,86,92,100]
#39	LCD CONTRAST	NORMAL	[NORMAL,DARKER]
#41	FAX ACTIVATION CODE	ON	[ON,OFF]
	CODE =	*9	
#42	MESSAGE ALERT	OFF	[ON,OFF]
#43	RECORDING TIME ALERT	OFF	[ON,OFF]
#44	MEMORY RECEIVE ALERT	ON	[ON,OFF]
#45	LINE MODE	CO	[CO,PBX]
#46	FRIENDLY RECEPTION	ON	[ON,OFF]
#47	FAX VOICE GUIDANCE	ON	[ERROR,ON,OFF]
#54	GREETING MSG. RECORDING TIME	16s	[16s,60s]
NOTE : If you change from 60sec. to 16sec. your-greeting will be erased and your new greeting will be limited to 16 seconds.			
#60	MESSAGE TRANSFER	OFF	[MESSAGE,PAGER,OFF]
	DESTINATION =		
#61	TRANSFER GREETING	CHECK	[CHECK,RECORD,ERASE]
#67	ICM MONITOR	ON	[ON,OFF]
#68	ECM COMMUNICATION	ON	[ON,OFF]
NOTE : You cannot change the setting of this feature, if there are stored documents in memory.			
#70	FAX PAGER CALL	OFF	[ON,OFF]
	DESTINATION =		
#76	CONNECTING TONE	ON	[ON,OFF]
#77	AUTO ANSWER MODE	TAD/FAX	[TAD/FAX,FAX ONLY,TEL/FAX]
#78	TEL/FAX DELAYED RING	2	[2...4]
#79	FILM DETECTION	ON	[ON,OFF]
#80	SET DEFAULT (EXCEPT #68)		

Note:

The above values are default.

2.5. SERVICE FUNCTION TABLE

Change from original pages 104~105 (**2.4.4. SERVICE FUNCTION TABLE**)

Code	Function	Set Value	Effective Range	Default	Remarks
501	Pause time set	X 100 ms.	001~600	**150**	
502	Flash time set	X 10 ms.	01~99	**2**	
510	**VOX time**	**1:6sec 2:4sec**	**1, 2**	**2**	--------
520	CED frequency select	1:2100 Hz 2:1100 Hz	1, 2	1	See the **Symptom/ Countermeasure Table** for long distance and international calls in **2.3.3.3.1. Defective facsimile section**.
521	International mode select	1:ON 2:OFF	1, 2	**1**	See the **Symptom/ Countermeasure Table** for long distance and international calls in **2.3.3.3.1. Defective facsimile section**.
522	Auto standby select	1:ON 2:OFF	1, 2	1	The resolution reverts to the default when transmission is complete.
523	Receive equalizer select	1:0km 2:1.8km 3:3.6km 4:7.2km	1~4	1	When the telephone station is far from the unit or reception cannot be performed correctly, adjust accordingly.
524	Transmission equalizer select	1:0km 2:1.8km 3:3.6km 4:7.2km	1~4	1	When the telephone station is far from the unit or transmission cannot be performed correctly, adjust accordingly.
533	**Setting the number of times that message transfer is redialed**	**00~99**	**00~99**	**03**	**Selects the number of times that message transfer is redialed (not including the first dialing).**
534	**Setting the message transfer / pager call redial interval**	**000~999**	**000~999**	**065**	**Sets the interval of message transfer / pager call redial.**
550	Memory clear: To reset the value to the default one, except the top margin (853)and left margin (854).				"START" input.
551	ROM check				"START" input.
552	DTMF single tone test	1:ON 2:OFF	1, 2	2	See **2.5. TEST FUNCTIONS**.
553	Monitor on FAX communication select	1: OFF 2:PHASE B 3:ALL phases	1~3	1	
554	Modem test				See **2.5. TEST FUNCTIONS**.
555	Scan check				See **2.5. TEST FUNCTIONS**.
556	Motor test			00	See **2.5. TEST FUNCTIONS**.
557	LED test				See **2.5. TEST FUNCTIONS**.
558	LCD test				See **2.5. TEST FUNCTIONS**.
559	Paper jam detection select	1:ON 2:OFF	1, 2	1	See **2.2.1. Paper Jam**.
561	KEY test				See **2.5. TEST FUNCTIONS**.
571	ITS auto redial time set	X number of times	00~99	**03**	Selects the number of times that ITS is redialed (not including the first dial).
572	ITS auto redial line disconnection time set	X second	001~999	**065**	Sets the interval of ITS redialing.
573	Remote turn-on ring number set	X number of rings	01~99	**15**	Sets the number of rings before the unit starts to receive a document in the TEL mode.
576	**K break detect**	**1:ON 2:OFF**	**1, 2**	**1**	--------
580	TAM continuous tone detection	1:ON 2:OFF	1, 2	1	ON: STOP TAM operation when Dial tone, etc. are detected.
590	FAX auto redial time set	X number of times	00~99	**03**	Selects the number of redial times during FAX communication (not including the first dial).
591	FAX auto redial time disconnection time set	X second	001~999	**065**	Sets the FAX redial interval during FAX communication.
592	CNG transmit select	1:OFF 2:ALL 3:AUTO	1~3	2	Lets you select the CNG output during FAX transmission. ALL: CNG is output at phase A. AUTO: CNG is output only when automatic dialing is performed. OFF: CNG is not output at phase A.
593	Time between CED and 300bps	1: 75 ms. 2:500 ms. 3:1 sec	1~3	1	See the Symptom/Countermeasure Table for long distance and international calls in **2.3.3.3.1. Defective facsimile section**.

Code	Function	Set Value	Effective Range	Default	Remarks
594	Overseas DIS detection select	1:detects at the 1st time 2:detects at the 2nd time	1, 2	1	See the Symptom/Countermeasure Table for long distance and international calls in **2.3.3.3.1. Defective facsimile section**.
595	Receive error limit value set	**X number of times**	**001~999**	**100**	Sets the number of acceptable error lines when the FAX reconstructs the received data.
596	Transmit level set	X dBm	-15~00	**8**	Selects the FAX transmission level.
598	Receiving sensitivity	43= -43 dBm	20~48	44	Used when there is an error problem. See the Symptom/Countermeasure Table for long distance and international calls in **2.3.3.3.1. Defective facsimile section**.
624	AT ring time out	1:3 sec 2:5 sec	1, 2	1	--------
711	**TONE/PULSE select**	**1:TONE 2:PULSE**	**1, 2**	**2**	--------
717	Transmit speed selection	1:14400BPS 2:12000BPS 3:9600BPS 4:7200BPS 5:4800BPS 6:2400BPS	1~6	1	Adjusts the speed to start training during FAX transmission.
718	Receive speed selection	1:14400BPS 2:12000BPS 3:9600BPS 4:7200BPS 5:4800BPS 6:2400BPS	1~6	1	Adjusts the speed to start training during FAX reception.
719	Ringer off in TEL/FAX mode	1:ON 2:OFF	1, 2	1	Sets the ringer switch off when a call is received in the TEL/FAX mode.
721	Pause tone detect	1:ON 2:OFF	1, 2	**1**	Selects the tone detection for pause in dialing.
722	Redial tone detect	1:ON 2:OFF	1, 2	1	Selects the tone detection mode after redialing.
724	PC-FAX ATD busy tone detect	1:ON 2:OFF	1, 2	1	--------
731	**CPC mode**	**1:A 2:B 3:OFF**	**1~3**	**1**	**Select the CPC signal detection mode from the converter.**
732	**Auto disconnect**	**1:350ms 2:1.8sec 3:OFF**	**1~3**	**1**	**Select the detection start time of auto disconnect.**
745	Power ON film feed	1:ON 2:OFF	1, 2	1	
763	CNG detect time for friendly reception	1:10 sec 2:20 sec 3:30 sec	1~3	3	Selects the CNG detection tome of friendly reception.
771	T1 timer	1:35 sec 2:60 sec	1, 2	1	Sets a higher value when the response from the other party needs more time during FAX transmission.
775	Monitoring of message transfer	1:ON 2:OFF	1, 2	2	--------
784	Voice prompt test				Press “START”.
815	Sensor & Vox check				See **2.5. TEST FUNCTIONS**.
852	Print test pattern				See **2.5. TEST FUNCTIONS**.
853	Top margin		1~9	--------	
854	Left margin		1~8	--------	
861	A4 size set	1:ON 2:OFF	1, 2	1	
880	Special service journal				See **2.4.7. SPECIAL SERVICE JOURNAL**.
881	Journal 2 list				See **2.4.7.3. PRINTOUT EXAMPLE**.
882	Journal 3 list				See **2.4.7.3. PRINTOUT EXAMPLE**.
890	TEL/FAX 1st ring back tone	1:ON 2:OFF	1, 2	1	Selects whether the TEL/FAX 1st ring back tone is ON or OFF in the TEL/FAX mode.
895	TEL/FAX mode receiving mode setting after bell time out	1:TAX 2:FAX	1, 2	2	--------

2.6. SERVICE MODE SETTINGS (Example of a printed out list)

Change from original page 106 (**2.4.5. SERVICE MODE SETTINGS**)

```
[ SERVICE DATA LIST ]

501 PAUSE TIME              =  050*100ms        [001...600]*100ms
502 FLASH TIME              =  12*10ms          [01...99]*10ms
510 VOX TIME                =  4sec             [1=6      2=4]sec
520 CED FREQ.               =  2100Hz           [1=2100   2=1100]Hz
521 INTL. MODE              =  ON               [1=ON     2=OFF]
522 AUTO STANDBY            =  ON               [1=ON     2=OFF]
523 RX EQL.                 =  0.0Km            [1=0.0    2=1.8   3=3.6   4=7.2]Km
524 TX EQL.                 =  0.0Km            [1=0.0    2=1.8   3=3.6   4=7.2]Km
853 TOP MARGIN              =  5                [1...9]
854 LEFT MARGIN             =  5                [1...8]

[ SPECIAL SERVICE SETTINGS ]

533   534   552   553   559   571   572   573   576   580   590   591   592
 03   065     2     1     1    03   065    15     2     1    03   065     2

593   594   595   596   598   624   711   717   718   719   721   722   724
  1     1   100    08    44     1     2     1     1     1     1     1     1

731   732   745   763   771   775   861   890   895
  1     1     1     3     1     2     1     1     2

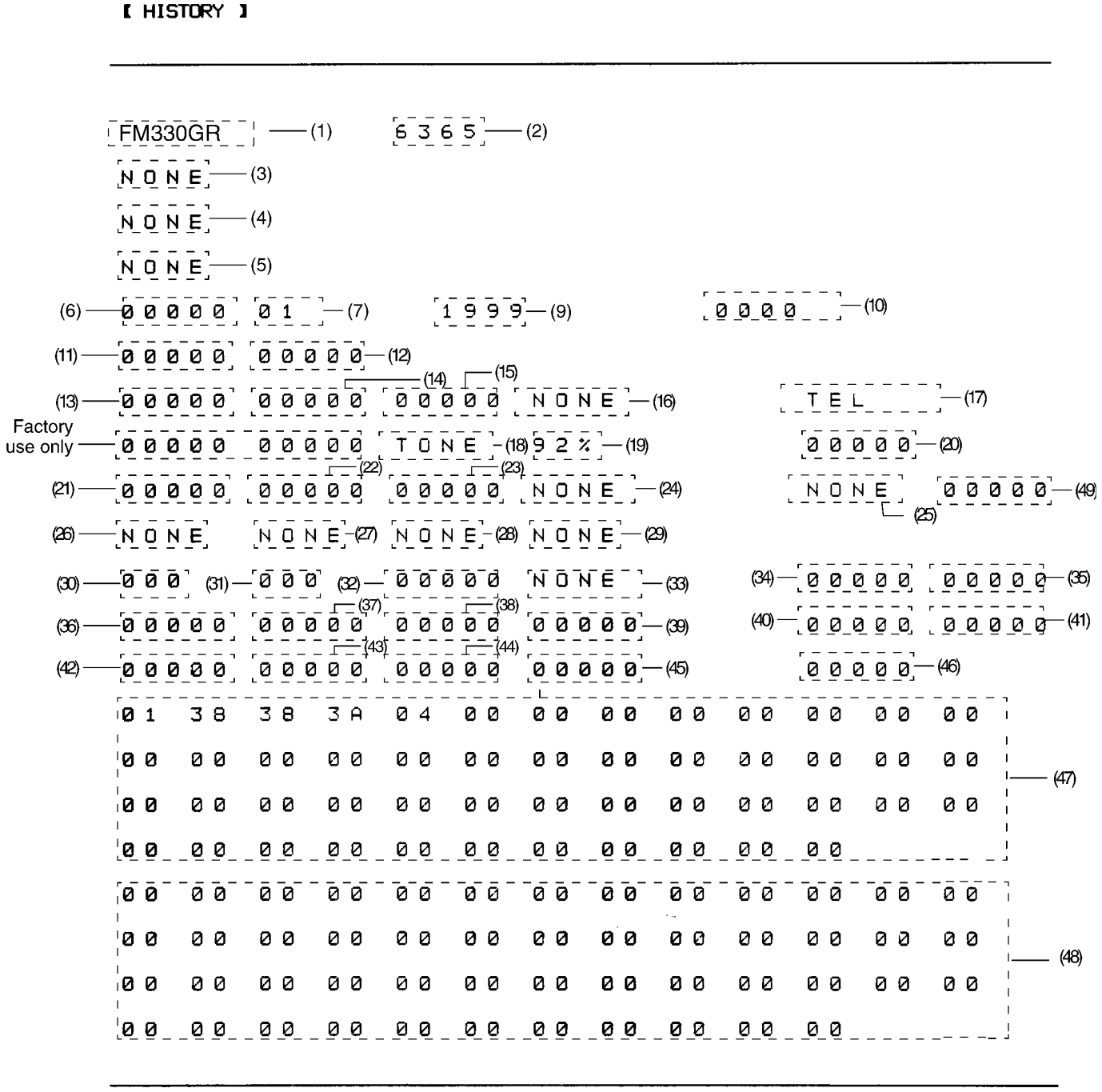
USAGE TIME = 00000 HOURS
```

Note:

The above values are default.

2.7. HISTORY

Change from original pages 106~110 (**[HISTORY] in 2.4.5. SERVICE MODE SETTINGS**)



Note:

See the following descriptions of this report. Item No. (1) ~ (49) are corresponding to the listed items in **2.7.1 Descriptions of the HISTORY Report**.

2.7.1. Descriptions of the HISTORY Report (Addition)

(1) ROM VERSION

EPROM version

(2) SUM

EPROM internal data calculation.

(3) YOUR LOGO

The user logo recorded in the unit. If it is not recorded, NONE will be displayed.

(4) YOUR TELEPHONE NUMBER

The user telephone number recorded in the unit. If it is not recorded, NONE will be displayed.

(5) FAX PAGER NUMBER

If you program a pager number into the unit, the pager number will be displayed here.

(6) FACTORY - CUSTOMER

This shows how many days from factory production until the user turns ON the unit.

(7) MONTH

The shows the very first month, date, year and time set by the user after they purchased the unit.

(8) DAY

The shows the very first month, date, year and time set by the user after they purchased the unit.

(9) YEAR

The shows the very first month, date, year and time set by the user after they purchased the unit.

(10) TIME

The shows the very first month, date, year and time set by the user after they purchased the unit.

(11) USAGE TIME

The amount of time the unit has been powered ON.

(12) FACTORY - NOW

This shows how many days from factory production until the user prints out this history list.

(13) TEL MODE

The amount of time the TEL mode setting was used.

(14) FAX MODE

The amount of time the FAX mode setting was used.

(15) TEL/FAX MODE

The amount of time the TEL/FAX mode setting was used.

(16) ANS/FAX MODE

The amount of time the ANS/FAX mode setting was used.

(17) FINAL RECEIVE MODE

The last set receiving mode by the user.

(18) TONE/PULSE SELECTION

The most recently used setting used, either TONE or PULSE.

(19) RECEIVE REDUCTION

The compression rate when receiving.

(20) SETTING NO. OF DIRECTORY

The recorded directory stations (one touch and JOG DIAL).

(21) NUMBER OF COPY

The number of pages copied.

(22) NUMBER OF RECEIVE

The number of pages received.

(23) NUMBER OF SENDING

The number of pages sent.

(24) NUMBER OF CALLER ID

The number of times Caller ID was received.

(25) NUMBER OF RECORDING MESSAGE

The number of messages recorded in TAM.

(26) NUMBER OF PC SCAN

The number of times multifunction was used for the Scanner. (The number of pages scanned. If the unit does not have a PC interface, NONE will be printed.)

(27) NUMBER OF PC-PRINT

The number of times multifunction was used for the Printer. (The number of pages printed. If the unit does not have a PC interface, NONE will be printed.)

(28) NUMBER OF RECEIVING TO PC

The number of times received in the PC through the FAX serial interface (RS232C). (The number of pages received. If the unit does not have a PC interface, NONE will be printed.)

(29) NUMBER OF SENDING FROM PC

The number of times transmitted from the PC through the FAX serial interface (RS232C). (The number of pages transmitted. If the unit does not have a PC interface, NONE will be printed.)

(30) NUMBER OF PRINTING WARNING LIST

The number of warning lists printed until now.

(31) NUMBER OF PRINTING HELP

The number of help lists printed until now.

(32) NUMBER OF DIVIDED PRINTING IN FAX RECEPTION

The number of faxes received that were divided into more than one sheet since the unit was purchased.

(33) DETECTION OF RS232C

When the fax and PC serial cable (RS232C) are connected and the signal is received correctly, COMPLETE will be printed. For models without a PC interface or when there is a PC interface but the signal cannot be received between the fax and PC, INCOMPLETE will be printed. (The number of pages transmitted. If the unit does not have a PC interface, NONE will be printed.)

(34) NO. OF IQ-FAX LOADING -OK:

(35)NO. OF IQ-FAX LOADING -NG:

You may not be able to use IQ-FAX if the special subscriber information is not loaded from the IQ-FAX center before use. Depending on the conditions of the communication line, it may not be completed in one time, so RETRIED will be performed. The number of OK and NG IQ-FAX loadings will be printed.

(36) FAX MODE

Means the unit received a fax message in the FAX mode.

(37) MAN RCV

Means the unit received a fax message by manual operation.

(38) FRN RCV

Means the unit received a fax message by friendly signal detection.

(39) VOX

Means the unit detected silence or no voice.

(40) RMT DTMF

Means the unit detected DTMF (Remote Fax activation code) entered remotely.

(41) PAL DTMF

Means the unit detected DTMF (Remote Fax activation code) entered by a parallel connected telephone.

(42) TURN-ON

Means the unit started to receive after 15 rings. (Remote Turn On: Service Code #573)

(43) TIME OUT

Means the unit started to receive after Ring Time Out in the EXT-TAM or TEL/FAX mode.

(44) IDENT

Means the unit detected Ring Detection.

(45) CNG OGM

Means the unit detected the CNG while it was sending the Dummy Ring Back Tone in the TEL/FAX mode, or while answering a call in the EXT-TAM mode. Or means the unit detected the CNG while it was sending the OGM in the ANS/FAX mode.

(46) CNG ICM

Means the unit detected the CNG while it was recording the ICM in the ANS/FAX mode.

(47) KEY OPERATION -1st 50:

(48) KEY OPERATION -Last 50:

Indicates 2-digit codes. Refer to **2.5.2. BUTTON CODE TABLE**.

- 1st 50:

  History of the first 50 key operations after purchase.

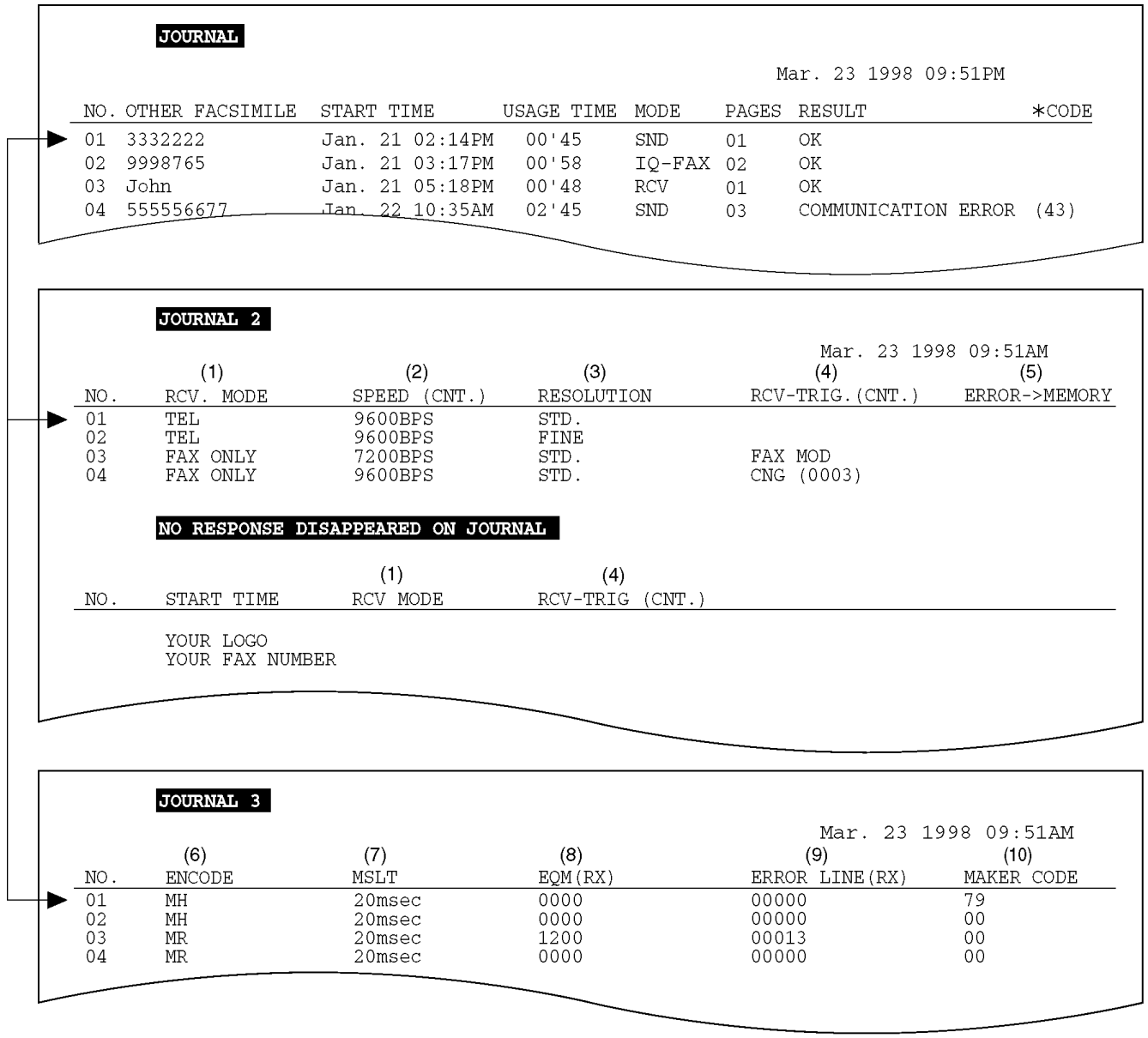
  (Ex.) If the MENU, # and 9 buttons are pressed, 20, 3C and 39 will be printed.

- Last 50:

  History of the last 50 key operations.

2.7.2. SPECIAL SERVICE JOURNAL REPORTS (Addition)

Journal 2 and Journal 3 shown below, which are special journals giving the additional detailed information about the latest 35 communications, can be printed by Service Code 881 or 882. Remote printing function for the journal reports (JOURNAL, JOURNAL 2 and JOURNAL 3) is also available for service technicians. (Refer to **2.3.3.3.2. Remote programming**.) The JOURNAL report only gives you basic information about a communication, but the other two journal reports provide different information on the same item (communication).



JOURNAL

Mar. 23 1998 09:51PM

NO.	OTHER FACSIMILE	START TIME	USAGE TIME	MODE	PAGES	RESULT	*CODE
01	3332222	Jan. 21 02:14PM	00'45	SND	01	OK	
02	9998765	Jan. 21 03:17PM	00'58	IQ-FAX	02	OK	
03	John	Jan. 21 05:18PM	00'48	RCV	01	OK	
04	555556677	Jan. 22 10:35AM	02'45	SND	03	COMMUNICATION ERROR	(43)

JOURNAL 2

Mar. 23 1998 09:51AM

NO.	(1) RCV. MODE	(2) SPEED (CNT.)	(3) RESOLUTION	(4) RCV-TRIG.(CNT.)	(5) ERROR->MEMORY
01	TEL	9600BPS	STD.		
02	TEL	9600BPS	FINE		
03	FAX ONLY	7200BPS	STD.	FAX MOD	
04	FAX ONLY	9600BPS	STD.	CNG (0003)	

NO RESPONSE DISAPPEARED ON JOURNAL

NO.	START TIME	(1) RCV MODE	(4) RCV-TRIG (CNT.)

YOUR LOGO
YOUR FAX NUMBER

JOURNAL 3

Mar. 23 1998 09:51AM

NO.	(6) ENCODE	(7) MSLT	(8) EQM(RX)	(9) ERROR LINE(RX)	(10) MAKER CODE
01	MH	20msec	0000	00000	79
02	MH	20msec	0000	00000	00
03	MR	20msec	1200	00013	00
04	MR	20msec	0000	00000	00

HOW TO READ JOURNAL REPORTS:

Example:

1. Look at NO. 01 in the JOURNAL. If you want to know about the details about that item, see NO. 01 in the JOURNAL 2 and the JOURNAL 3. You can get the following information.
   * MODE: Fax transmission
   * RCV. MODE: TEL
   * TX SPEED: 9.6 kbps
   * RESOLUTION: standard
   * ENCODE: MH
   * MAKER CODE: 79
2. Look at NO. 04 in the JOURNAL 2. CNG (0003) indicates that the CNG signal has been received three times since the purchase date.

   For further details, see **2.7.3. JOURNAL 2** and **2.7.4 JOURNAL 3**.

2.7.3. JOURNAL 2 (Refer to JOURNAL 2 in 2.7.5. PRINTOUT EXAMPLE.)...Addition

Journal 2 displays the additional detailed information about the last 35 communications.

Descriptions:

(1) RCV. MODE

Indicates which receive mode the unit was in when the unit received a fax message.

This information is also displayed when the unit transmitted a fax message.

(2) SPEED

Indicates the speed of the communication. If multiple pages are transmitted or received, it indicates the last page´scommunication speed. If there is a communication error, “?” is displayed.

(3) RESOLUTION

Indicates the resolution of the communication. If multiple pages are transmitted or received, it indicates the last page´sresolution. If there is a communication error, “?” is displayed.

(4) RCV-TRIG. (CNT.)

Indicates the trigger that causes the unit to switch to the fax receive mode. The available options are listed in JOURNAL 2 in **2.7.5. PRINTOUT EXAMPLE**. The values in parentheses indicate how many times the trigger has been used. (For example,“0003” means three times.)

No.	Display	Function
1	FAX MODE	Means the unit received a fax message in the FAX mode.
2	MAN RCV	Means the unit received a fax message by manual operation.
3	FRN RCV	Means the unit received a fax message by friendly signal detection.
4	VOX	Means the unit detected silence or no voice.
5	RMT DTMF	Means the unit detected DTMF (Remote Fax activation code) entered remotely.
6	PAL DTMF	Means the unit detected DTMF (Remote Fax activation code) entered by a parallel connected telephone.
7	TURN-ON	Means the unit started to receive after 15 rings. (Remote Turn On: Service Code #573)
8	TIME OUT	Means the unit started to receive after Ring Time Out in the EXT-TAM or TEL/FAX mode.
9	IDENT	Means the unit detected Ring Detection.
10	CNG OGM	Means the unit detected the CNG while it was sending the Dummy Ring Back Tone in the TEL/FAX mode. OR Means the unit detected the CNG while it was sending the OGM in the ANS/FAX mode.
11	CNG ICM	Means the unit detected the CNG while it was recording the ICM in the ANS/FAX mode.

(5) ERROR MEMORY

Indicates the reason why the unit received a fax message in memory.

If you look at No.11 in the JOURNAL 2 in **2.7.5. PRINTOUT EXAMPLE**, it shows the fax message was received in memory due to “PAPER OUT” error.

NO RESPONSE DISAPPEARED ON JOURNAL

The “**NO RESPONSE DISAPPEARED ON JOURNAL**” displays the information about the last 10 communications terminatedby “No Response”. (Some of the communications terminated by “No Response” were not displayed in the JOURNAL.)

When a fax transmission cannot be performed because the other party´s unit is set to the TEL mode, “No response” will beprinted.

2.7.4. JOURNAL 3 (Refer to JOURNAL 3 in 2.7.5. PRINTOUT EXAMPLE.)...Addition

Descriptions:

(6) ENCODE

Compression Code: MH/MR

(7) MSLT

MSLT means Minimum Scan Line Time. Used only at the factory.

(8) EQM

EQM means Eye Quality Monitor. Used only at the factory.

(9) ERROR LINE(RX)

When an error occurs while receiving a fax, this shows the number of error lines.

(10) MAKER CODE

This shows a 2 digit code of the other party´s fax machine brand.

0E: “KX” model

00: Unknown

79: “UF” model

19: “Zerox” model

2.7.5. PRINTOUT EXAMPLE (Addition)

JOURNAL2

Mar. 25 1998 01:59PM

NO.	RCV. MODE	SPEED (CNT.)	RESOLUTION	RCV-TRIG. (CNT.)	ERROR->MEMORY
01	FAX ONLY	9600BPS	FINE.	FAX MOD	
02	FAX ONLY	9600BPS	STD.	FAX MOD	
03	FAX ONLY	9600BPS	FINE.		
04	FAX ONLY	9600BPS	FINE.	FAX MOD	
05	FAX ONLY	9600BPS	FINE.	FAX MOD	
06	FAX ONLY	9600BPS	FINE.	FAX MOD	
07	FAX ONLY	9600BPS	FINE.		
08	FAX ONLY	9600BPS	FINE.		
09	FAX ONLY	9600BPS	FINE.		
10	FAX ONLY	9600BPS	STD.	FAX MOD	
11	FAX ONLY	9600BPS	FINE.	FAX MOD	PAPER OUT
12	FAX ONLY	9600BPS	STD.	FAX MOD	
13	FAX ONLY	9600BPS	STD.		
14	FAX ONLY	?	?		
15	FAX ONLY	?	?		
16	FAX ONLY	?	?		
17	FAX ONLY	9600BPS	STD.		
18	FAX ONLY	9600BPS	FINE.	FAX MOD	
19	FAX ONLY	9600BPS	STD.	FAX MOD	
20	FAX ONLY	9600BPS	S-FINE.		
21	FAX ONLY	9600BPS	FINE.		
22	FAX ONLY	9600BPS	FINE.	FAX MOD	
23	FAX ONLY	?	?	FAX MOD	
24	FAX ONLY	9600BPS	STD.	FAX MOD	
25	FAX ONLY	9600BPS	STD.	FAX MOD	
26	FAX ONLY	9600BPS	FINE.	FAX MOD	
27	FAX ONLY	9600BPS	FINE.		
28	FAX ONLY	9600BPS	STD.	FAX MOD	
29	FAX ONLY	9600BPS	FINE.	FAX MOD	
30	FAX ONLY	9600BPS	S-FINE.	FAX MOD	
31	FAX ONLY	9600BPS	STD.	FAX MOD	
32	FAX ONLY	9600BPS	STD.	FAX MOD	
33	FAX ONLY	?	?	FAX MOD	
34	FAX ONLY	9600BPS	STD.	FAX MOD	
35	FAX ONLY	9600BPS	STD.	FAX MOD	

NO RESPONSE DISAPPEARED ON JOURNAL

NO.	START TIME	RCV MODE	RCV-TRIG. (CNT.)

JOURNAL 3

Mar. 25 1998 01:58PM

NO.	ENCODE	MSLT	EQM(RX)	ERROR LINE(RX)	MAKER CODE
01	MR	10msec	007A	00000	0E
02	MR	20msec	016B	00000	00
03	MH	10msec	0000	00000	00
04	MR	20msec	019B	00003	00
05	MR	20msec	0156	00011	00
06	MR	20msec	0113	00000	00
07	MR	5msec	0000	00000	79
08	MR	5msec	0000	00000	79
09	MR	0msec	0000	00000	19
10	MR	20msec	0100	00000	00
11	MR	10msec	0073	00000	0E
12	MR	20msec	012B	00000	00
13	MH	20msec	0000	00000	79
14	MH	20msec	0000	00000	00
15	MH	20msec	0000	00000	00
16	MH	20msec	0000	00000	00
17	MR	5msec	0000	00000	79
18	MR	10msec	00AB	00004	0E
19	MR	20msec	0124	00000	00
20	MR	20msec	0000	00000	00
21	MR	20msec	0000	00000	00
22	MR	20msec	0135	00000	00
23	MR	20msec	0000	00000	00
24	MR	20msec	01BC	00000	00
25	MR	20msec	01AC	00000	00
26	MR	20msec	020F	00000	00
27	MR	10msec	0000	00000	0E
28	MR	20msec	01DF	00000	00
29	MR	20msec	01EA	00000	00
30	MR	20msec	00CD	00000	00
31	MR	20msec	02F8	00000	0E
32	MR	10msec	04F8	00000	0E
33	MR	10msec	0000	00000	00
34	MR	20msec	03B6	00000	0E
35	MH	20msec	00E0	00000	00

2.8. TEST FUNCTIONS

Change from original page 111 (**2.5. TEST FUNCTIONS**)

The codes listed below can be used to perform simple checks of some of the unit's functions. When complaints are received from customers, they provide an effective tool for identifying the locations and causes of malfunctions.

Test mode	Type of Mode	Code □□□ Operation after code input	Function
MOTOR TES	Service Mode	5 5 6 START	Rotate the transmission and reception motors to check the operation of the motors. 00.....top 10.....Forward RX motor 01.....Forward TX motor 11.....Forward RX and TX motor 20.....Backward RX motor 02.....Backward TX motor 20.....Backward RX and TX motor •Press the STOP button to quit.
MODEM TEST	Service Mode	5 5 4 START	First, make the handset OFF-HOOK and then you can enter this Test Mode.Each time you press the start key, each of the signals will be heard in the following order from the hand-set. 1) OFF → 2) 14400bps → 3) 12000bps → 4) 9600bps (V17)→ 5) 7200bps (V17)→ 6) 9600bps → 7) 7200bps → 8) 4800bps → 9) 2400bps → 10) 300bps →11) 2100Hz →12) 1100Hz
ROM CHECK	Service Mode	5 5 1 START	Indicate the version and check sum of the ROM.
SCAN CHECK	Service Mode	5 5 5 START	Turn on the LEDs of the CCD unit and operate the read system. This is also used to adjust the CCD.
LCD CHECK		5 5 8 START	Check the LCD indication. Service Mode Illuminate all dots to check if they are normal.
DTMF SINGLE TEST	Service Mode	5 5 2 1..On 2..Off	Output DTMF as single tones. Used to check the frequencies of the individual DTMF tones. Refer to **2.5.1 DTMF Single Tone Transmit Select**
LED TEST	Service Mode	5 5 7 START	All LEDs above the operation panel board flashes on and off, or is illuminated.
KEY CHECK	Service Mode	5 6 1 START {any key}	Check the operation button. Indicate the button code at LCD while the button is pressed. Refer to **2.5.2 Button Code Table**
FACTORY SET	Service Mode	5 5 0 START	Clear the memory in which the user can store data.
CCD AUTO POSITION ADJUSTMENT	Service Mode	5 6 4 START	Used only at the factory.
PRINT TEST PATTERN	Service Mode	8 5 2 0 START	Print out the test pattern. Used chiefly at the factory to test print quality. Can select 1~4. (See page **2.5.3 PRINT TEST PATTERN**)
DIGITAL SPEAKERPHONE RX &TX XHECK	Service Mode	8 4 1 SPEAKERPHONE	Refer to **2.3.3.5.1. Digital Speakerphone**.
RS 232C TEST	Service Mode	8 7 0 START	Communication test for RS-232C serial port. (Refer to **2.3.3.4.3. RS-232C serial communication**.)

3 CIRCUIT OPERATIONS

3.1. NCU SECTION

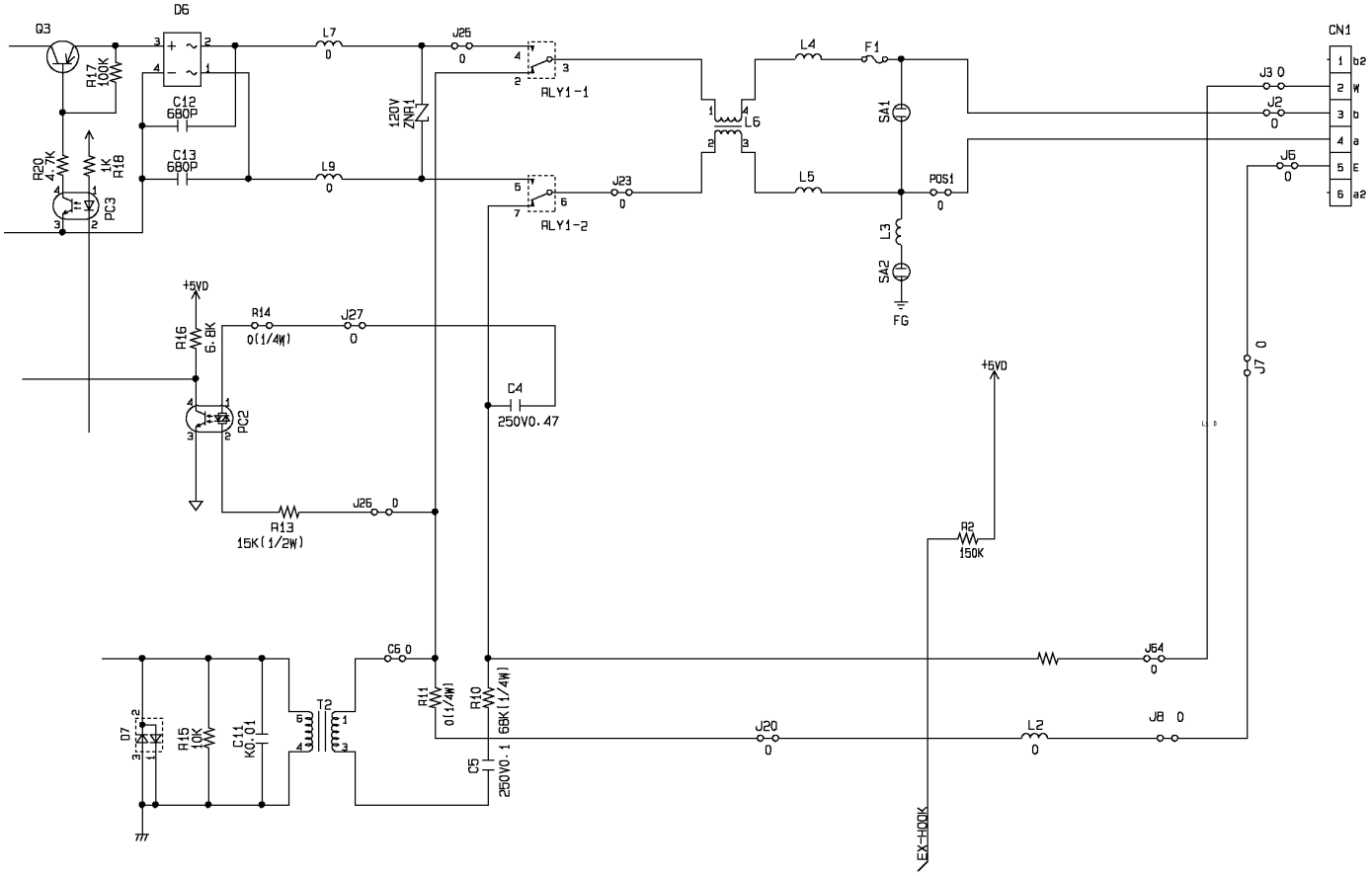
Change from original page 172 (**6.9. NCU SECTION**)

3.1.1. GENERAL

This section is the interface with the telephone line. It is composed of a telephone line connection, bell detection circuit, pulse dial circuit, auto disconnect circuit, side tone circuits and remote fax activation circuit.

3.1.2. TELEPHONE LINE CONNECTION

Circuit Diagram



3.1.3. AUTO DISCONNECT CIRCUIT

Addition to original page 173 (**6.9. NCU SECTION**)

1. **Function**

   This circuit is used to detect that the telephone connected in parallel to the same line is OFF-hook while the unit picks up the line. If this detection circuit is activated when TAM is being delivered, the delivery stops and the circuit is automatically released.

2. **Circuit Operation**

   If the line is picked up, C19 is charged by following the path shown below.

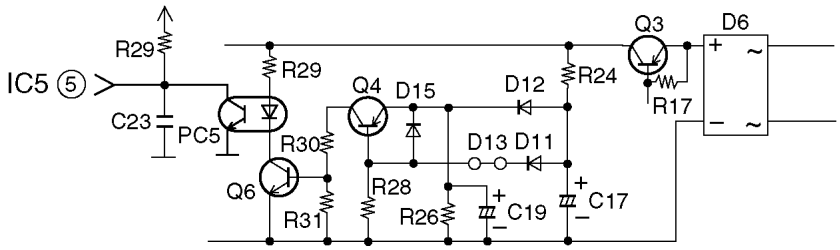
   D6 (+) → Q3 → R24 → D12 → C19

   When the electric potential difference between the base and emitter of Q4 becomes less than about 0.3V, Q4 and Q6 and PC5 turn off, then the IC5 pin 5 becomes a high level.

   In this condition, if a telephone connected in parallel goes into OFF-hook status, the base of Q4 becomes low. On the other hand, the emitter of Q4 goes down because the capacitor (C19) is charged. Q4 turns on when the electric potential difference between the base and emitter of Q4 becomes more than 0.6 V while being charged.

   When Q4 turns on, Q6 and PC5 also turn on, then the IC5 pin 5 becomes a low level.

Circuit Diagram



3.1.4. REMOTE FAX ACTIVATION CIRCUIT

Change from original page 174 (**6.9.7. REMOTE FAX ACTIVATION CIRCUIT**)

1. **Function**

   Another telephone connected to the same line activates the unit to the FAX mode by using a DTMF signal.

2. **Signal Path**

   Refer to **2.3.3.5. Analog Board Section**.

3.2. SPECIAL CIRCUIT ON THE ANALOG BOARD.....Deleted

Change from original page 176 (**6.12. SPECIAL CIRCUIT ON THE ANALOG BOARD**)

3.2.1. CURRENT DETECTION CIRCUIT.....Deleted

Change from original page 176 (**6.12.1. CURRENT DETECTION CIRCUIT**)

3.2.2. LOW PASS FILTER.....Deleted

Change from original page 176 (**6.12.2. LOW PASS FILTER**)

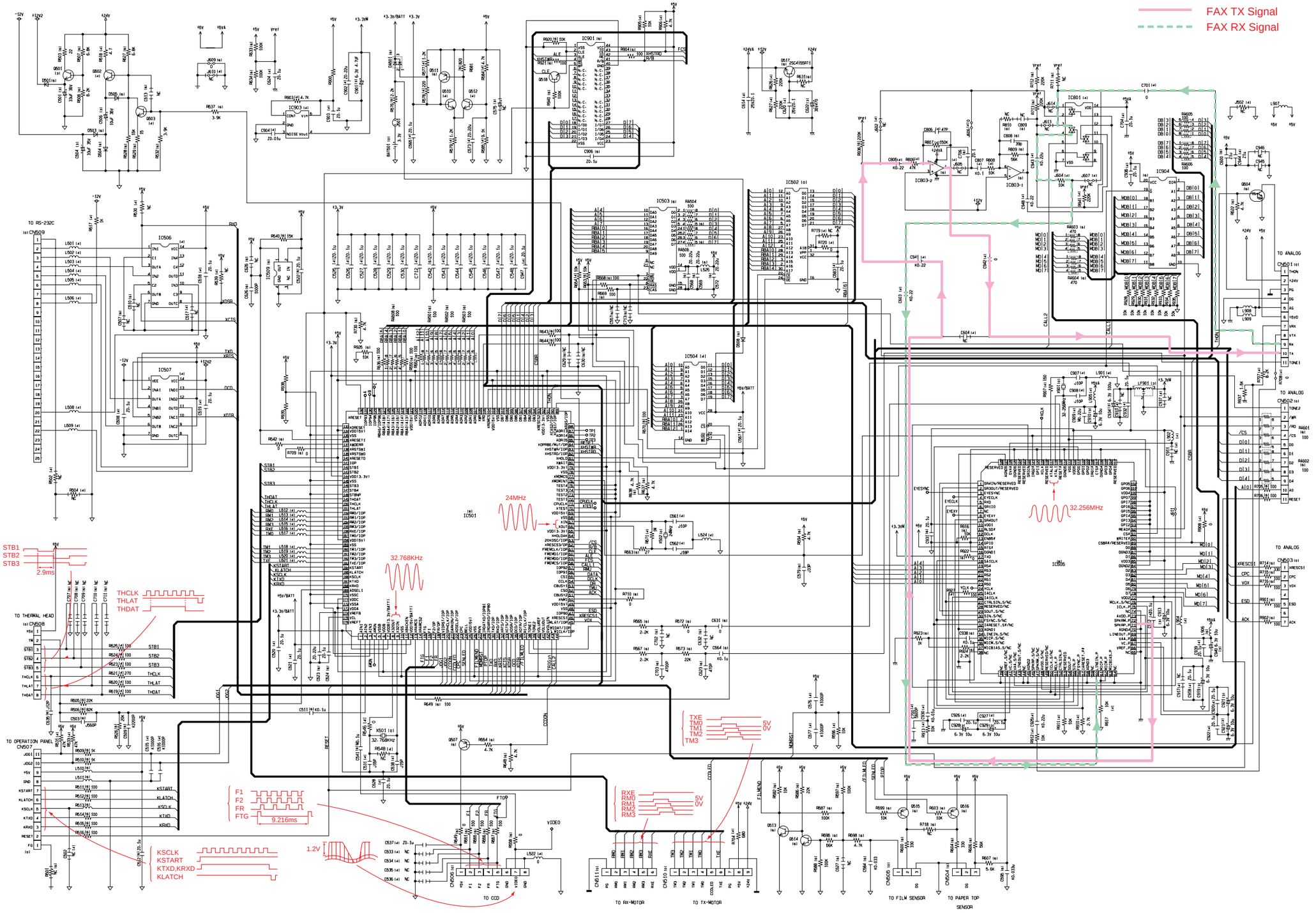
3.3. EXPLANATION OF ANALOG GATE ARRAY (IC5 on the Analog Board)

Change from original page 178 (**6.13.2. EXPLANATION OF ANALOG GATE ARRAY**)

Pin No.	Name	Function	I/O	Pin No.	Name	Function
1	DGND	GND (Digital)	—	41	PROUT1	PRE-AMP1 output
2	BREAK	Controls pulse dialing	O	42	AGND	GND (Analog)
3	MDMRX	FAX RX Signal ON/OFF	O	43	RTONE	Not Used
4	NOT USED	----------	I	44	RIN	Handset receiver AMP input
5	$\overline{\text{DCN}}$	Detects parallel TEL OFF-hook	I	45	ROUT1	Handset receiver AMP output 1
6	H/S ALC	Detects line current for ALC	I	46	ROUT2	Handset receiver AMP output 2
7	NOT USED	----------	I	47	NOT USED	----------
8	NOT USED	----------	O	48	NOT USED	----------
9	P-SHORT	Improves wave form of pulse dialing	O	49	NOT USED	----------
10	$\overline{\text{WR}}$	Writes enable	I	50	NOT USED	----------
11	$\overline{\text{RD}}$	Reads enable	I	51	MICIN	MIC AMP input
12	$\overline{\text{CS}}$	Chip select	I	52	HSMIC-	Handset MIC AMP (-) input
13	D0	Data In/Out	I/O	53	HSMICOUT	Handset MIC AMP output
14	D1	Data In/Out	I/O	54	HSMIC+	Handset MIC AMP (+) input
15	D2	Data In/Out	I/O	55	NL2IN	Side tone suppressing AMP input
16	D3	Data In/Out	I/O	56	NL2OUT	Side tone suppressing AMP output
17	D4	Data In	I	57	NL2IN	Suppressing sensitivity adjustment
18	RS	Resistor select	I	58	VREF	Reference voltage output
19	RESET	Reset this IC	I	59	LINEIN	Line RX-AMP input
20	DVDD	5V (Digital)	—	60	VCC	5V (Analog)
21	DGND	GND (Digital)	—	61	EXIN	EXT AMP input
22	NOT USED	----------	O	62	EXOUT	EXT AMP output
23	NOT USED	----------	O	63	LINEOUT	Line TX-AMP output
24	NOT USED	----------	O	64	VREF2	Reference voltage output
25	NOT USED	----------	O	65	ALCIN	ALC-AMP input
26	LINE-RLY	Controls line relay (RLY1)	O	66	ALCDET	Attack/recovery time adjustment
27	SP-MUTE	Mutes control to speaker AMP (IC3)	O	67	PROUT2	PRE-AMP2 output
28	NOT USED	----------	I	68	RECIN	Recording signal input
29	$\overline{\text{BELL}}$	Detects bell signal	I	69	RECPRIN	Recording PRE-AMP input
30	MDMSRX	SP-Phone RX Signal ON/OFF	O	70	RECPROUT	Recording PRE-AMP output
31	MDMTRX	TAM RX Signal ON/OFF	O	71	LSRXOUT	SP-Phone MIC signal output
32	NOT USED	----------	O	72	PLYOUT	Play AMP output
33	NOT USED	----------	O	73	PLYIN	Play AMP input
34	DVDD	5V (DIGITAL)	—	74	LSTXOUT	SP-Phone speaker signal output
35	A-OUT	RX signal output to DTMF receiver		75	LSTXIN	SP-Phone speaker signal input
36	NOT USED	----------		76	TONE IN1	DTMF monitor signal input
37	NOT USED	----------		77	TONE IN2	Alarm/keytone input
38	SPOUT	Speaker AMP output		78	TONE IN3	Ringing signal input
39	SPPROUT	Speaker PRE-AMP output		79	TONE IN4	Pulse dial monitor signal input
40	SPPRIN	Speaker PRE-AMP (-) input		80	AGND	GND (Analog)

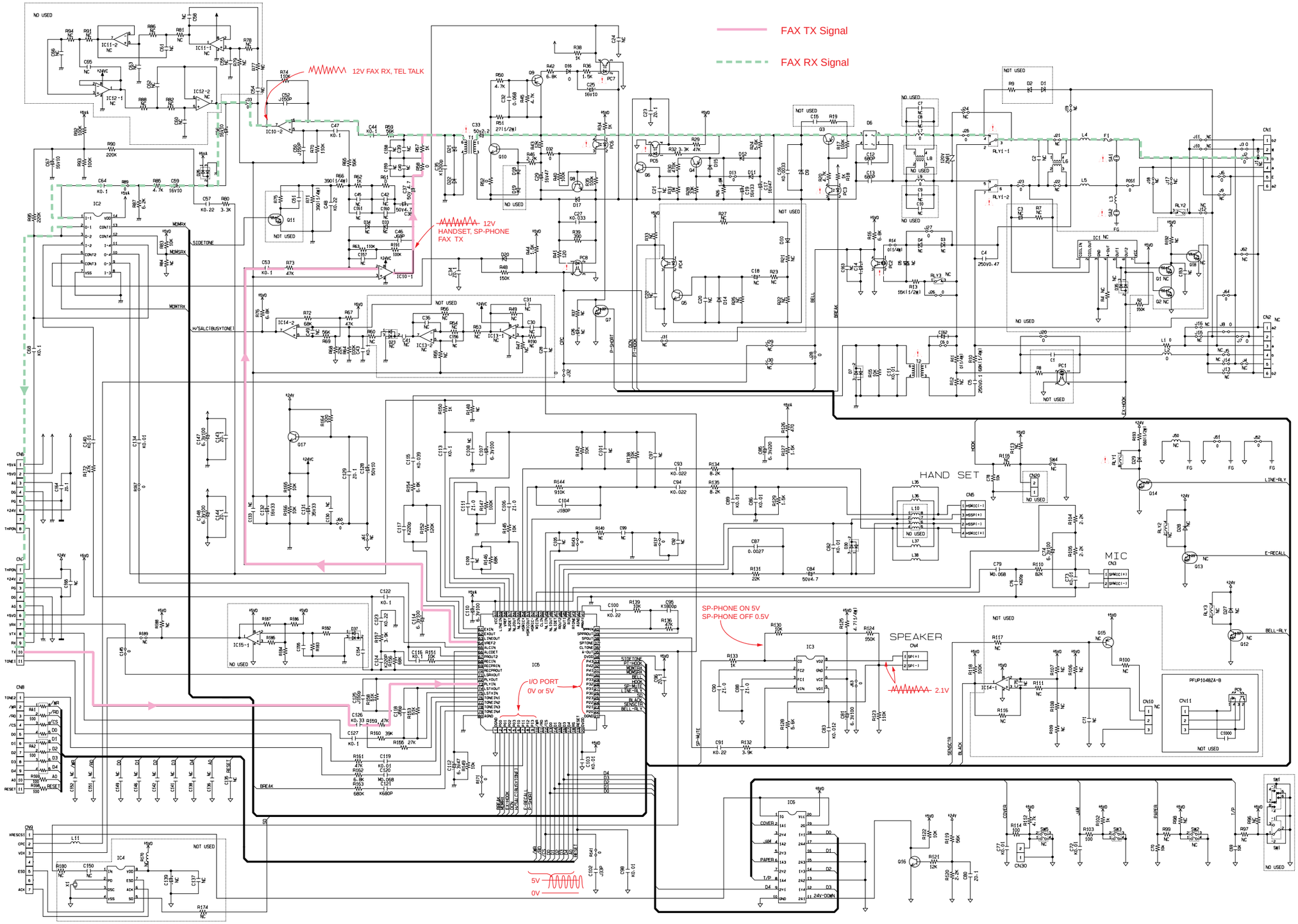
4 SCHEMATIC DIAGRAM (DIGITAL CIRCUIT)

Change from original page 191 (**9.1. SCHEMATIC DIAGRAM (DIGITAL CIRCUIT)**)

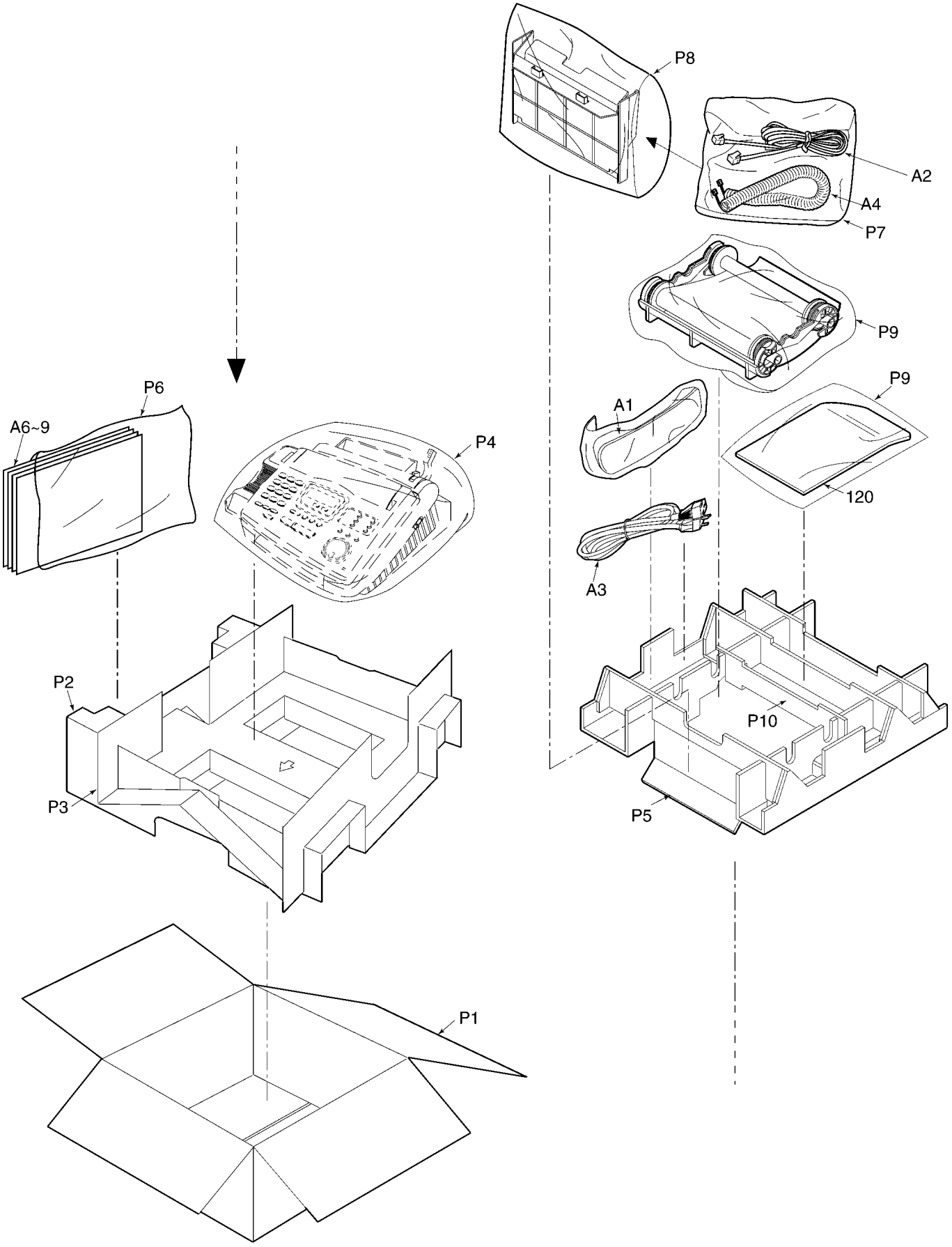


5 SCHEMATIC DIAGRAM (ANALOG CIRCUIT)

Change from original page 192 (**9.2. SCHEMATIC DIAGRAM (ANALOG CIRCUIT)**)



6 ACCESSORIES AND PACKING MATERIALS



7 REPLACEMENT PARTS LIST

Change from original page 206~220 (**14 REPLACEMENT PARTS LIST**)

This replacement parts list is for KX-FM330GR only.

Refer to the simplified manual (cover) for other areas.

Notes:

1. The marking (RTL) indicates that the Retention Time is limited for this item.

   After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependent on the type of assembly, and in accordance with the laws governing parts and product retention.

   After the end of this period, the assembly will no longer be available.

2. Important safety notice
   Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacture´s specified parts.

3. The S mark indicates service standard parts and may differ from production parts.

4. RESISTORS & CAPACITORS
   Unless otherwise specified;
   All resistors are in ohms (Ω) K=1000Ω, M=1000kΩ
   All capacitors are in MICRO FARADS (µF) P=µµF
   *Type & Wattage of Resistor

Type

ERC:Solid ERD:Carbon PQ4R:Chip	ERX:Metal Film ERG:Metal Oxide ERO:Metal Film	PQRD:Carbon PQRQ:Fuse ERF:Wire Wound

Wattage

10,16,18:1/8W	14,25,S2:1/4W	12,50,S1:1/2W	1:1W	2:2W	5:5W

ECFD:Semi-Conductor ECQS:Styrol PQCBX,ECUV:Chip ECMS:Mica	ECCD,ECKD,PQCBC,PQVP : Ceramic ECQM,ECQV,ECQE,ECQU,ECQB : Polyester ECEA,ECSZ,ECOS : Electrolytic ECQP : Polypropylene

Voltage

ECQ Type	ECQG ECQV Type	ECSZ Type	Others	
1H : 50V 2A : 100V 2E : 250V 2H : 500V	05 : 50V 1 : 100V 2 : 200V	OF : 3.15V 1A : 10V 1V : 35V OJ : 6.3V	OJ : 6.3V 1A : 10V 1C : 16V 1E,25 : 25V	1V : 35V 50,1H : 50V 1J : 63V 2A : 100V

7.1. CABINET AND ELECTRICAL PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
		(12.1. PAPER CASSETTE SECTION)	
1	PFYEF1010AL	PAPER TRAY	
1-1	PFYE2F1010AL	SUB PAPER TRAY	
1-2	PFKS1013Z1	TRAY	
2	PFMD1026Z	COVER, PAPER CASSETTE	
3	PFHG1032Z	RUBBER PARTS, CASSETTE SEP.	
4	PFUS1087Z	SPRING	
5	PFDE1041Z3	LEVER, CASSETTE LOCK	S
6	Not Used		
7	PFKS1011W1	PAPER CASSETTE	S
8	PFDG1034Z	GEAR	
9	PFQT1258Y	INDICATION LABEL	
10	PFKK1004Z	SHUTTER	
11	PFHR1043Z1	RIBBON CASSETTE	
12	PFDG1038Z1	GEAR	
13	PFDG1037Z	GEAR	
14	PFQT1221Z	INDICATION LABEL	
15	PFPE1040Z	INK FILM (20m)	
		(12.2. OPERATION PANEL SECTION)	
20	Not Used		
21	PFKS1027Z1	TRAY, DOCUMENT	
22	Not Used		
23	PFGG1035P1	OPERATION PANEL	
24	PFGP1129U	PANEL	
25	PFGD1040Y	TEL. NO. CARD	
26	PFGV1006Z	TRANSPARENT PLATE	
27	Not Used		
28	PFGP1127Z	COVER, LED	
29	PFGP1091Z	COVER, LED	
30	PFKR1010Z2	DOCUMENT GUIDE-L	
31	PFKR1011Z2	DOCUMENT GUIDE-R	
32	PFUS1034Z	SPRING	
33	PFDG1002Z	GEAR	
34	PFBX1065Z1	BUTTON, DIAL	
35	PFBC1028Z1	BUTTON, HELP	
36	PFBC1029Z1	BUTTON, STOP etc.	
37	Not Used		
38	PFBC1020Z1	BUTTON, START	
39	PFBX1067Z1	BUTTON, ONE TOUCH	
40	PFAVJS10401	LIQUID CRYSTAL DISPLAY	
41	PFDE1037Z	LEVER, LOCK	
42	PFDF1016Z	SHAFT	
43	PFDE1067Z	LEVER, LOCK	
44	PFUS1080Z	SPRING	
45	PFDE1019Z	LEVER, DOCUMENT DETECTION	
46	PFUS1027Z	SPRING	
47	PFDE1020Y	LEVER, READ DETECTION	
48	PFJS11Q06Z	CONNECTOR, 10P	
49	PFUV1021Z	COVER, OPERATION PANEL	
50	PFHR1019Z	LEVER, ADJUST	
51	PFUS1121Z	SPRING	
52	PFUS1026Y	SPRING, SUPPORT ROLLER	
53	PQDR10005Y	ROLLER	
54	PFHX1081Z	SHEET, READING	
55	PFUS1082Z	SPRING	
56	PFHR1081Z	GUIDE, SEPARATION RUBBER	
57	PFHG1020Z	SEPARATION RUBBER	
58	PFDE1043Y	LEVER, SENSOR	
59	PFKF1009Z1	SUB CABINET, OPERATION	
60	PFZU1FP200M	HEAD FRAME ASS´Y	
60-1	PFHX1115Z	SHEET, RIBBON GUIDE	
61	PFZU2FP200M	ANGLE ASS´Y	
61-1	PFHX1115Z	SHEET, RIBBON GUIDE	
62	PFDE1034X	GUIDE-L	
63	PFMH1038Y	ANGLE	
64	PFUS1083Z	SPRING	
65	PFDE1035X	GUIDE-R	
66	PFJS12Q41Z	CONNECTOR, 15P	
67	PFJHS013Z	THERMAL HEAD	
68	PFUS1025Z	SPRING	
69	PFDF1005Z	SHAFT	

Ref. No.	Part No.	Part Name & Description	Remarks
70	PQDR9685Y	ROLLER, SUPPORT	
71	PFHR1047Y	ARM-L	
72	PFUS1088Z	SPRING	
73	PFUS1109Z	SPRING	
74	PFBC1036Z1	BUTTON, FILM REMAINING	
75	PFBX1066Z1	BUTTON, AUTO ANSWER	
76	PFBX1068Y1	BUTTON, ERASE/RECORD	
77	PFBE1002Z4	JOG DIAL	
78	PFHX1199Z	JOG SHEET	
79	PQLB5C3	FERRITE CORE	
80	PFBX1068Z1	BUTTON, ERASE/RECORD	
81	PQJM128Z	MICROPHONE	
82	PFJS02Q09Z	CONNECTOR, 2P	
		(12.3. UPPER CABINET/P.C.B. SECTION)	
90	PFKM1014Y1	HANDSET CRADLE, UPPER	
91	PFBH1004Y1	BUTTON, HOOK	
92	PFJS03R49Y	CONNECTOR, 3P	
93	PQAS5P13Y	SPEAKER	
94	PFJS02R54Z	CONNECTOR, 2P	
95	PFKM1015Z1	HANDSET CRADLE, LOWER	
96	PFKF1032Z1	UPPER CABINET	
97	PFZEFP250M	GUIDE, SEPARATION RUBBER	
97-1	PFHG1045Z	RUBBER PARTS, P. SEPARATION	
97-2	PFHX1114Z	SEPARATION SHEET	
98	PFJS03R52Z	CONNECTOR, 3P	
99	PFDE1042Z	LEVER, SENSOR	
100	PFUS1068Z	SPRING	
101	PQHX10155Z	COVER	
102	PQDE10055Z	LEVER, SENSOR	
103	PFUS1076Z	SPRING	
104	PQLB1E1	FERRITE CORE	
105	PFJP03S04Z	AC INLET	⚠
106	PFJS02R19Y	CONNECTOR, 2P	
107	PFMD1030Z	COVER	
108	PFGT1519Z-M	NAME PLATE	
109	KR06TT251508	FERRITE CORE	
110	PFHG1050Z	FOOT	
111	PQHM171Z	ROM LID	
112	PFUS1086Z	SPRING	
113	PFHX1170Z	VIBRATION SHEET	
114	PFHX1148Z	VIBRATION SHEET	
115	PFHX1171Z	VIBRATION SHEET	
116	PFNW1002Z	WASHER	
117	PFQT1250Z	CAUTION LABEL	
118	PFHX1165Z	POWER ENCLOSURE SHEET	
119	PFMD1023Z	POWER SHEELD	
120	PFZE1FP300G	PAPER STACKER ASS´Y	
120-1	PFKS1020Z1	PAPER STACKER	
120-2	PFKS1021Y1	SUB PAPER STACKER	
121	Not Used		
122	PQHM112Z	CLAMPER	
123	PQHR136Z	CLAMPER	
124	PQHR10215Z	CLAMPER	
125	PQHR945Z	LEAD BINDER	
		(12.4. MECHANICAL SECTION)	
130	PFDF1018Z	SHAFT, RIBON GUIDE	
131	PFDG1027Y	GEAR, PLATEN DRIVE	
132	PFDJ1011Z	SPACER, PLATEN	
133	PFDN1010Z	ROLLER, PLATEN	
134	PFDJ1007Z	SPACER, ROLLER	
135	PFDN1006Z	ROLLER, DOCUMENT FEED	
136	PFDG1004Z	GEAR, DOCUMENT FEED	
137	PFUS1073Z	SPRING, POP UP	
138	PFDJ1006Z	SPACER, ROLLER	

Ref. No.	Part No.	Part Name & Description	Remarks
139	PFDN1005Z	ROLLER, DOCUMENT FEED	
140	PFDG1003Z	GEAR, DOCUMENT FEED ROLLER	
141	PFKM1020S1	CABINET, MAIN	
142	PFDN1011Z	ROLLER, PICK UP	
143	PQDJ10002Z	SPACER, ROLLER	
144	PFUS1067Z	SPRING, CLUTCH	
145	PFDG1074Z	GEAR, PICK UP ROLLER	
146	PFUS1122Y	SPRING, EARTH	
147	XUC2FY	RETAINING RING	
148	PQHM112Z	CLAMPER	
149	PFNW1003Z	WASHER	
150	PFHG1030Z	RUBBER PARTS	
151	XWE5VW	WASHER	
152	PFDG1036Z	GEAR, ENCORDER	
153	PFUS1065Z	SPRING, BACK TENSION	
154	PFUA1009Y	CHASSIS, TX GEAR	
155	PFDG1032Y	GEAR, IDLER	
156	PFDG1033Y	GEAR, IDLER	
157	PFUS1019Z	SPRING, THRUST	
158	PFDG1005Z	GEAR, CHANGEOVER	
159	PFDE1014Z	ARM, CHANGEOVER	
160	PFDG1009Z	GEAR, IDLER	
161	PFDG1008Z	GEAR, IDLER	
162	PFUS1017Y	SPRING, STATIC ELECTRIC	
163	PFDG1007Z	GEAR, IDLER	
164	PFMD1016Y	COVER, MAIN	
165	PFDN1004Z	ROLLER, SEPARATION	
166	PQUS10055Z	SPRING, ONE WAY	
167	PFDG1012Z	GEAR, SEPARATION ROLLER	
168	PFJQ1011Z	TX MOTOR	
169	PFDG1031Y	GEAR, IDLER	
170	PFUS1018X	SPRING, STATIC ELECTRIC	
171	PFDG1039Y	GEAR, RIBBON DRIVE	
172	PFDG1076Z	GEAR, IDLER	
173	PFDG1075Z	GEAR, IDLER	
174	PFUA1013Z	CHASSIS, RX GEAR	
175	PFDF1019Y	SHAFT, PARALELL PIN	
176	PFDX1011Y	GEAR, WIND TORQUE LIMITER	
177	PFJQ1014Y	RX MOTOR	
178	PFDR1005Z	ROLLER, DUMPER	
179	PFJS03R57Z	CONNECTOR, 3 PIN	
			S
180	PFUS1071Z	SPRING, OPEN BUTTON	
181	PFHR1048Z	ARM, STOPPER	
182	PFJS06Q01Z	CONNECTOR, 6 PIN	
183	PFJS09R56Z	CONNECTOR, 9 PIN	
184	PFHX1139Z	COVER, ROLLING SHEET	
185	PFHR1044Z	GUIDE, DUMPER HOLDER	
186	PFYTFP200M	OPEN BUTTON ASS´Y	
187	PQFN51Z	WASHER	
188	PFDG1029Y	GEAR, RIBBON DRIVE	
189	PFQT1221Z	INDICATION LABEL	
190	PFHX1171Z	COVER, VIBRATION SHEET	
191	PQLB1C1	FERRITE CORE	
		(12.5. CCD UNIT SECTION)	
200	PFWLF780M	CHASSIS ASS´Y	
200-1	PFVDSLA30222	LED ARRAY	
201	PF0G1001Z	TARGET GLASS	
202	PFUS1021Z	SPRING	
203	PF0L1001Z	LENS	
204	PFHE1004Z	NUT	
205	PFJS08R58Z	CONNECTOR, 8P	
206	PFMD1007Z	COVER	
207	PFUS1028Z	SPRING	
208	PF0M1003Z	MIRROR, SMALL	
209	PF0M1001Z	MIRROR, LARGE	
210	PF0M1002Z	MIRROR, MIDDLE	

Ref. No.	Part No.	Part Name & Description	Remarks
		(13 ACCESSORIES AND PACKING MATERIALS)	
A1	PFJXE0305Z	HANDSET	
A2	PQJA10075Z	CORD, TEL	
A3	PQJA10038Y	POWER CORD, AC	⚠
A4	PFJA1029Z	CORD, HANDSET	
A5	Not Used		
A6	PFQX1362Z	INSTRUCTION BOOK	
A7	PFJK102A1121	CD-ROM	
A8	PFQX1366Z	INSTRUCTION BOOK for CD-ROM	
A9	PFQW1314Z	QUICK GUIDE	
P1	PFPK1577Z-M	PACKING CASE	
P2	PFPN1114Z	CUSHION-A	
P3	PFPN1115Z	CUSHION-B	
P4	PFPH1011Z	SOFT SHEET	
P5	PFPN1116Z	UPPER PAD	
P6	XZB32X45A04	BAG, POLYETHYLENE	
P7	XZB20X20A04	BAG, POLYETHYLENE	
P8	XZB20X35A04	BAG, POLYETHYLENE	
P9	XZB21X43A04	BAG, POLYETHYLENE	
P10	PFPD1092Z	CUSHION, STOPPER	

7.2. DIGITAL BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB1	PFWP1FM330BL	DIGITAL BOARD ASS´Y (RTL)	
		(ICS)	
IC501	PFVIM66410G1	IC	
IC502	PFWIFM330BL1	IC (ROM)	
IC503	MN41480CSJ07	IC	S
IC504	PFVIGM6256FF	IC	S
IC505	PFVIR675813	IC	
IC506	PFVIMC1489AM	IC	
IC507	PFVIMC1488ML	IC	
IC509	PFVIS80842AN	IC	
IC801	PQVITC4066BF	IC	S
IC803	PQVINJM4558M	IC	S
IC901	PFVIKM29W4AT	IC	
IC903	PFVIMM1385EN	IC	
IC904	PFVITVT245FT	IC	
		(TRANSISTORS)	
Q501	2SD1994A	TRANSISTOR(SI)	
Q502	2SD874A	TRANSISTOR(SI)	
Q503	2SD874A	TRANSISTOR(SI)	
Q504	PQVTDTC114EU	TRANSISTOR(SI)	
Q507	2SB1197K	TRANSISTOR(SI)	
Q510	2SC4155R	TRANSISTOR(SI)	
Q511	2SB1197K	TRANSISTOR(SI)	
Q512	2SC4155R	TRANSISTOR(SI)	
Q513	2SC4155R	TRANSISTOR(SI)	
Q514	2SC4155R	TRANSISTOR(SI)	
Q515	2SB709A	TRANSISTOR(SI)	
Q516	2SB709A	TRANSISTOR(SI)	
Q517	2SC4155R	TRANSISTOR(SI)	
Q518	2SC4155R	TRANSISTOR(SI)	
		(DIODES)	

Ref. No.	Part No.	Part Name & Description	Remarks
D501	RLS71	DIODE(SI)	
D503	RLS71	DIODE(SI)	
D504	RLS71	DIODE(SI)	
D505	RLS71	DIODE(SI)	
D508	RLS71	DIODE(SI)	
DA501	MA141WK	DIODE(SI)	
		(BATTERY)	
BAT501	PQPCR2032H09	BATTERY	S
		(CONNECTORS)	
CN501	PQJP11A19Z	CONNECTOR, 11P	
CN502	PQJP11A19Z	CONNECTOR, 11P	
CN503	PQJP07A19Z	CONNECTOR, 7P	
CN504	PQJP03G100Z	CONNECTOR, 3P	
CN505	PQJP3G30Y	CONNECTOR, 3P	
CN507	PQJP11G30Y	CONNECTOR, 11P	
CN508	PFJP08A12Z	CONNECTOR, 8P	
CN509	PFJS25A05Y	CONNECTOR, 25P	
CN510	PQJP9G30Y	CONNECTOR, 9P	
CN511	PQJP06G100	CONNECTOR, 6P	
		(COILS)	
L501-L506	PQLQR1RM601	COIL	
L508-L509	PQLQR1RM601	COIL	
L510-L519	PQLQR1RM601	COIL	
L520-L521	PQLQR1RM601	COIL	
L521	PQLQR1RM601	COIL	
L524	PQLQR1ET	COIL	
L525	PQLQR1RM601	COIL	
L901	PQLQR1ET	COIL	
L902	PQLQR1ET	COIL	
L904	PQLQR1ET	COIL	
L905	PQLQR1RM601	COIL	
L906	PQLQR1RM601	COIL	
L907	PQLQR1RM601	COIL	
		(CERAMIC FILTERS)	
L908	PFVF2B222ST	CERAMIC FILTER	
L909	PFVF2B222ST	CERAMIC FILTER	
LF901	EXCEMT222D	CERAMIC FILTER	
R513	PFVF2B222ST	CERAMIC FILTER	
		(CRYSTAL OSCILLATIONS)	
X501	PFVCCFS32Z	CRYSTAL OSCILLATOR	
X502	PFVCCSA24Z	CRYSTAL OSCILLATOR	
X901	PFVC32256ZAT	CRYSTAL OSCILLATOR	
		(COMPONENTS COMBINATIONS)	

Ref. No.	Part No.	Part Name & Description	Remarks
RA501	EXRV8V101JV	COMPONENTS PARTS	
RA502	EXRV8V101JV	COMPONENTS PARTS	
RA503	EXRV8V101JV	COMPONENTS PARTS	
RA504	EXRV8V101JV	COMPONENTS PARTS	
RA505	EXRV8V101JV	COMPONENTS PARTS	
RA508	EXRV8V101JV	COMPONENTS PARTS	
RA601	EXRV8V101JV	COMPONENTS PARTS	
RA602	EXRV8V101JV	COMPONENTS PARTS	
RA603	EXRV8V471JV	COMPONENTS PARTS	
RA604	EXRV8V471JV	COMPONENTS PARTS	
RA605	EXRV8V101JV	COMPONENTS PARTS	
RA606	EXRV8V101JV	COMPONENTS PARTS	
		(RESISTORS)	
C631	ERJ3GEY0R00	0	
C701	ERJ3GEY0R00	0	
C942	ERJ6GEY0R00	0	
J604	ERJ3GEYJ103	0	
J606	ERJ3GEY0R00	0	
J609	ERJ8GEY0R00	0	
J611	ERJ3GEY0R00	0	
L522	ERJ3GEY0R00	0	
R502	ERJ3GEY0R00	0	
R503	PQ4R10XJ220	22	S
R505	ERJ3GEYJ223	22k	
R506	ERJ3GEYJ823	82k	
R507	ERJ3GEYJ682	6.8k	
R508	ERJ3GEYJ822	8.2k	
R509	ERJ3GEYJ102	1k	
R510	ERJ3GEYJ102	1k	
R511	ERJ3GEYJ101	100	
R512	ERJ3GEYJ101	100	
R514	ERJ3GEYJ101	100	
R515	ERJ3GEYJ101	100	
R516	ERJ3GEYJ101	100	
R517	PQ4R10XJ102	1k	S
R518	PQ4R10XJ4R7	4.7	S
R519	ERJ3GEYJ101	100	
R520	ERJ3GEYJ101	100	
R521	ERJ3GEYJ271	270	
R522	ERJ3GEYJ472	4.7k	
R523	ERJ3GEYJ101	100	
R524	ERJ3GEYJ101	100	
R525	ERJ3GEYJ101	100	
R526	ERJ3GEYJ203	20k	
R527	ERJ3GEYJ682	6.8k	
R528	ERJ3GEYJ153	15k	
R529	PQ4R10XJ150	15	
R531	ERJ3GEYJ473	47k	
R532	ERJ3GEYJ392	3.9k	
R533	ERJ3GEYJ473	47k	
R537	ERJ3GEYJ392	3.9k	
R540	ERJ3GEYJ153	15k	
R542	ERJ3GEY0R00	0	
R546	ERJ3GEY0R00	0	
R549	ERJ3GEY0R00	0	
R550	ERJ3GEYJ101	100	
R551	ERJ3GEYJ101	100	
R552	ERJ3GEYJ101	100	
R554	ERJ3GEYJ472	4.7k	

Ref. No.	Part No.	Part Name & Description	Remarks
R555	ERJ3GEYJ101	100	
R556	ERJ3GEYJ101	100	
R557	ERJ3GEYJ101	100	
R558	ERJ3GEY0R00	0	
R563	ERJ3GEYJ270	27	
R565	ERJ3GEYJ222	2.2k	
R567	ERJ3GEYJ222	2.2k	
R568	ERJ3GEYJ101	100	
R569	ERJ3GEYJ101	100	
R570	ERJ3GEYJ101	100	
R571	ERJ3GEYJ105	1M	
R572	ERJ3GEY0R00	0	
R573	ERJ3GEYJ223	22k	
R576	ERJ3GEYJ222	2.2k	
R577	ERJ3GEYJ122	1.2k	
R578	ERJ3GEYJ221	220	
R579	ERJ3GEYJ122	1.2k	
R581	ERJ3GEYJ821	820	
R582	ERJ3GEYJ103	10k	
R584	ERJ3GEYJ472	4.7k	
R585	PQ4R10XJ912	9.1k	S
R586	ERJ3GEYJ223	22k	
R587	ERJ3GEYJ104	100k	
R588	ERJ3GEYJ104	100k	
R594	ERJ3GEYJ472	4.7k	
R595	ERJ3GEYJ563	56k	
R596	ERJ3GEYJ103	10k	
R597	ERJ3GEYJ104	100k	
R598	ERJ3GEYJ472	4.7k	
R599	ERJ3GEYJ103	10k	
R600	ERJ3GEYJ331	330	
R603	ERJ3GEYJ103	10k	
R604	ERJ3GEYJ331	330	
R606	ERJ3GEYJ563	56k	
R607	ERJ3GEYJ562	5.6k	
R626	ERJ3GEYJ224	220k	
R627	ERJ3GEYJ224	220k	
R631	ERJ3GEYJ103	10k	
R633	ERJ3GEYJ104	100k	
R634	ERJ3GEYJ104	100k	
R636	ERJ3GEYJ101	100	
R637	ERJ3GEYJ472	4.7k	
R638	ERJ3GEYJ472	4.7k	
R643	ERJ3GEYJ101	100	
R644	ERJ3GEYJ101	100	
R648	ERJ3GEYJ472	4.7k	
R649	ERJ3GEYJ101	100	
R653	ERJ3GEYJ103	10k	
R654	ERJ3GEYJ103	10k	
R704	PQ4R10XJ681	680	S
R705	ERJ3GEYJ101	100	
R706	ERJ3GEYJ101	100	
R707	ERJ3GEYJ822	8.2k	
R708	ERJ3GEY0R00	0	
R709	ERJ3GEY0R00	0	
R710	ERJ3GEY0R00	0	
R712	ERJ3GEYJ224	220k	
R713	ERJ3GEYJ224	220k	
R714	ERJ3GEYJ331	330	
R715	ERJ3GEYJ101	100	
R716	ERJ3GEYJ101	100	

Ref. No.	Part No.	Part Name & Description	Remarks
R720	ERJ3GEY0R00	0	
R730	ERJ3GEYJ472	4.7k	
R806	ERJ3GEYJ473	47k	
R807	ERJ3GEYJ154	150k	
R808	ERJ3GEYJ103	10k	
R809	ERJ3GEYJ563	56k	
R900	PQ4R18XJ8R2	8.2	S
R901	ERJ3GEYJ101	100	
R902	ERJ3GEYJ101	100	
R903	ERJ3GEYJ472	4.7k	
R904	ERJ3GEYJ101	100	
R905	ERJ3GEYJ103	10k	
R906	ERJ3GEYJ472	4.7k	
R907	ERJ3GEYJ151	150	
R908	ERJ3GEY0R00	0	
R910	ERJ3GEYJ272	2.7k	
R911	ERJ3GEYJ103	10k	
R912	ERJ3GEYJ103	10k	
R913	ERJ3GEYJ103	10k	
R916	ERJ3GEYJ103	10k	
R917	ERJ3GEYJ103	10k	
R920	ERJ3GEYJ103	10k	
R921	ERJ3GEYJ101	100	
R922	ERJ3GEY0R00	0	
R923	ERJ3GEYJ102	1k	
R924	ERJ3GEYJ222	2.2k	
R925	ERJ3GEYJ103	10k	
R927	ERJ3GEYJ101	100	
R928	ERJ3GEYJ103	10k	
R929	ERJ3GEYJ103	10k	
R930	ERJ3GEYJ103	10k	
R931	ERJ3GEYJ103	10k	
R932	ERJ3GEYJ103	10k	
R933	ERJ3GEYJ103	10k	
R934	ERJ3GEYJ103	10k	
R935	ERJ3GEYJ103	10k	
R936	ERJ3GEYJ224	220k	
R937	ERJ3GEYJ152	1.5k	
R939	ERJ3GEY0R00	0	
R940	ERJ3GEYJ104	100k	
R941	ERJ3GEYJ224	220k	
		(CAPASITORS)	
C501	ECEA1VKA330	33	
C503	ECUV1H561JCV	560P	
C504	ECEA1VKA330	33	
C506	ECEA1VKA100	10	
C508	ECUV1H104ZFV	0.1	S
C509	ECUV1H222KBV	0.0022	
C511	ECUV1C104KBV	0.1	
C512	ECUV1H104ZFV	0.1	S
C515	ECUV1H102KBV	0.001	
C516	ECUV1H102KBV	0.001	
C518	ECUV1H104ZFV	0.1	S
C519	ECUV1H104ZFV	0.1	S
C520	ECUV1H104ZFV	0.1	S
C521	ECUV1H104ZFV	0.1	S
C522	ECUV1H104ZFV	0.1	S
C523	ECUV1C224ZFV	0.22	
C524	ECUV1H104ZFV	0.1	S
C525	ECUV1H104ZFV	0.1	S
C526	ECUV1H104ZFV	0.1	S

Ref. No.	Part No.	Part Name & Description	Remarks
C527	ECUV1H104ZFV	0.1	S
C528	ECUV1H104ZFV	0.1	S
C529	ECUV1H104ZFV	0.1	S
C530	ECUV1H104ZFV	0.1	S
C531	ECUV1H150JCV	15P	
C537	ECUV1H104ZFV	0.1	S
C538	ECUV1H150JCV	15P	
C541	ECUV1C104KBV	0.1	
C542	ECUV1H104ZFV	0.1	S
C543	ECUV1H104ZFV	0.1	S
C544	ECUV1H104ZFV	0.1	S
C545	ECUV1H104ZFV	0.1	S
C546	ECUV1H104ZFV	0.1	S
C547	ECUV1H104ZFV	0.1	S
C548	ECUV1H104ZFV	0.1	S
C561	ECUV1H100DCV	10P	S
C562	ECUV1H180JCV	18P	
C564	ECUV1C104KBV	0.1	
C565	ECUV1H104ZFV	0.1	S
C567	ECUV1H104ZFV	0.1	S
C568	ECUV1C224ZFV	0.22	
C569	ECUV1C224ZFV	0.22	
C572	ECUV1C224ZFV	0.22	
C573	ECUV1C224ZFV	0.22	
C576	ECUV1H102KBV	0.001	
C577	ECUV1H102KBV	0.001	
C579	ECUV1H330JCV	33P	
C583	ECUV1H104ZFV	0.1	S
C584	ECUV1H333KDV	0.033	S
C595	ECUV1H333KDV	0.033	S
C600	PQCUV1H105JC	1	S
C603	ECUV1A224KBV	0.22	
C614	ECUV1H104ZFV	0.1	S
C620	ECUV1H104ZFV	0.1	S
C622	ECEA1VKA470	47	
C623	ECUV1H471JCV	470P	
C624	ECUV1H104ZFV	0.1	S
C626	ECUV1H102KBV	0.001	
C628	ECUV1H104ZFV	0.1	S
C635	ECUV1H120JCV	12P	
C700	ECUV1H562KBV	0.0056	
C703	ECUV1H472KBV	0.0047	
C704	ECUV1H104ZFV	0.1	S
C706	PQCUV1E104MD	0.1	S
C712	ECUV1H104ZFV	0.1	S
C805	PQCUV1C224KB	0.22	
C806	ECUV1H470JCV	47P	
C807	ECUV1H681JCV	680P	
C808	ECUV1H390JCV	39P	
C901	ECEA1HKS4R7	4.7	S
C902	PQCUV1C224KB	0.22	S
C903	ECUV1H104ZFV	0.1	S
C904	ECUV1H103KBV	0.01	
C906	ECUV1H104ZFV	0.1	S
C907	ECUV1H100DCV	10P	S
C908	ECUV1H100DCV	10P	S
C909	PQCUV1C224KB	0.22	S
C910	ECEA1CKS100	10	S
C912	ECUV1H104ZFV	0.1	S

Ref. No.	Part No.	Part Name & Description	Remarks
C913	ECEA1CKS100	10	S
C918	ECUV1H104ZFV	0.1	S
C919	ECEA1CKS100	10	S
C920	PQCUV1E104MD	0.1	S
C921	ECEA1CKS100	10	S
C922	PQCUV1E104MD	0.1	S
C923	ECEA1CKS100	10	S
C925	PQCUV1C224KB	0.22	
C926	PQCUV1E104MD	0.1	S
C927	PQCUV1E104MD	0.1	S
C928	ECEA1CKS100	10	S
C929	ECEA1CKS100	10	S
C930	PQCUV1H103KB	0.01	
C931	ECUV1H104ZFV	0.1	S
C932	ECUV1H104ZFV	0.1	S
C934	ECEA0JKS101	100	
C935	ECUV1H104ZFV	0.1	S
C938	ECUV1C104KBV	0.1	
C939	ECUV1H104ZFV	0.1	S
C940	ECEA1CKS100	10	S
C941	PQCUV1C224KB	0.22	
C943	ECUV1A224KBV	0.22	
C944	PQCUV1H105JC	1	S
C947	ECUV1H104ZFV	0.1	S
C948	ECUV1A224KBV	0.22	

7.3. ANALOG BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB2	PFLP1230BLZ	ANALOG BOARD ASS´Y (RTL)	⚠
		(ICS)	
IC2	PQVITC4066BF	IC	S
IC3	PQVINJM2113M	IC	
IC5	AN6116FAQ	IC	
IC6	PQVISN7H244S	IC	S
IC10	PQVINJM4558M	IC	S
IC14	PQVINJM2903M	IC	
		(TRANSISTORS)	
Q3	2SA1627	TRANSISTOR(SI)	
Q4	2SB1218A	TRANSISTOR(SI)	
Q6	2SC4155S	TRANSISTOR(SI)	
Q7	PQVTDTC143E	TRANSISTOR(SI)	
Q8	2SC4155S	TRANSISTOR(SI)	
Q9	2SB1218A	TRANSISTOR(SI)	
Q10	2SC2235	TRANSISTOR(SI)	
Q14	PQVTDTC143E	TRANSISTOR(SI)	
Q16	2SC1740S	TRANSISTOR(SI)	
Q17	2SD1921Q	TRANSISTOR(SI)	
		(DIODES)	
D7	MA143	DIODE(SI)	
D9	MA4180	DIODE(SI)	
D11	RLS71	DIODE(SI)	
D12	MA700A	DIODE(SI)	

Ref. No.	Part No.	Part Name & Description	Remarks
D15	RLS71	DIODE(SI)	
D17	PQVDHZS2B1	DIODE(SI)	
D20	RLS71	DIODE(SI)	
D21	MA4056	DIODE(SI)	
D22	MA4056	DIODE(SI)	
D25	MA143	DIODE(SI)	
D29	RLS71	DIODE(SI)	
D30	MA143	DIODE(SI)	
		(CONNECTORS)	
CN3	PQJP2G30Z	CONNECTOR, 2P	
CN4	PQJP02G100Z	CONNECTOR, 2P	
CN6	PQJP08B11Z	CONNECTOR, 8P	
CN7	PQJS11A10Z	CONNECTOR, 11P	
CN8	PQJS11A10Z	CONNECTOR, 11P	
CN9	PQJS07A10Z	CONNECTOR, 7P	
CN30	PFJP02A09Z	CONNECTOR, 2P	
		(JACKS)	
CN1	PQJJ1T011Z	JACK	
CN5	PQJJ1TB18Z	JACK	
		(COILS)	
L4	PQLQR1E32A07	COIL	
L5	PQLQR1E32A07	COIL	
L6	PFLE003	COIL	S
L11	PQLQR2BT	COIL	S
L35	PQLQR2BT	COIL	S
L36	PQLQR2BT	COIL	S
L37	PQLQR2BT	COIL	S
L38	PQLQR2BT	COIL	S
		(RESISTORS)	
C145	ERJ6GEY0R00	0	
D13	ERDS2TJ000	0	
D16	ERDS2TJ000	0	
D32	ERJ8GEY0R00	0	
J2	ERDS2TJ000	0	
J3	ERJ6GEY0R00	0	
J6	ERJ6GEY0R00	0	
J7	ERJ6GEY0R00	0	
J8	ERJ6GEY0R00	0	
J20	ERDS2TJ000	0	
J23	ERJ6GEY0R00	0	
J25	ERJ6GEY0R00	0	
J26	ERJ6GEY0R00	0	
J27	ERJ6GEY0R00	0	
J28	ERJ3GEY0R00	0	

Ref. No.	Part No.	Part Name & Description	Remarks
J32	ERJ3GEY0R00	0	
J33	ERJ3GEY0R00	0	
J51	ERJ8GEY0R00	0	
J52	ERJ8GEY0R00	0	
J60	ERJ6GEY0R00	0	
J63	ERJ3GEY0R00	0	
J64	ERJ6GEY0R00	0	
L1	ERJ8GEY0R00	0	
L2	ERJ8GEY0R00	0	
L7	ERDS2TJ000	0	
L9	ERDS2TJ000	0	
POS1	ERDS2TJ000	0	
R2	ERJ3GEYJ154	150k	
R10	ERDS2TJ683	68k	
R11	ERDS2TJ000	0	
R13	ERDS1TJ153	15k	
R14	ERDS2TJ000	0	
R15	ERJ3GEYJ103	10k	
R16	ERJ3GEYJ682	6.8k	
R17	PQ4R10XJ104	100k	
R18	ERJ3GEYJ102	1k	
R20	PQ4R10XJ472	4.7k	S
R24	PQ4R10XJ562	5.6k	S
R26	PQ4R10XJ185	1.8M	S
R28	PQ4R10XJ333	33k	S
R29	ERJ3GEYJ473	47k	
R30	PQ4R10XJ474	470k	S
R31	PQ4R10XJ105	1M	S
R32	PQ4R10XJ332	3.3k	S
R34	ERJ3GEYJ102	1k	
R35	PQ4R10XJ104	100k	S
R36	PQ4R10XJ152	1.5k	S
R38	ERJ3GEYJ102	1k	
R39	PQ4R10XJ391	390	S
R40	PQ4R10XJ104	100k	S
R41	PQ4R10XJ121	120	S
R42	PQ4R10XJ682	6.8k	S
R43	PQ4R10XJ123	12k	S
R44	ERJ3GEYJ152	1.5k	
R45	PQ4R10XJ472	4.7k	S
R46	PQ4R10XJ222	2.2k	S
R48	ERJ3GEYJ154	150k	
R50	PQ4R10XJ472	4.7k	S
R51	ERDS1TJ270	27	S
R52	ERJ6GEY0R00	0	
R57	ERDS2TJ102	1k	
R58	ERDS2TJ000	0	
R59	ERJ3GEYJ563	56k	
R61	ERDS2TJ000	0	
R62	ERDS2TJ102	1k	
R63	ERJ3GEYJ114	110k	
R64	ERJ3GEYJ104	100k	
R65	ERJ3GEYJ563	56k	
R66	ERDS2TJ391	390	
R67	ERJ3GEYJ473	47k	
R68	ERJ3GEYJ223	22k	
R69	ERJ3GEYJ563	56k	
R70	ERJ3GEYJ114	110k	
R71	ERDS2TJ391	390	
R72	ERJ3GEYJ683	68k	
R73	ERJ3GEYJ473	47k	

Ref. No.	Part No.	Part Name & Description	Remarks
R74	ERJ3GEYJ114	110k	
R76	ERJ3GEYJ682	6.8k	
R80	ERJ3GEYJ332	3.3k	
R83	ERJ3GEYJ103	10k	
R85	ERJ3GEYJ472	4.7k	
R87	ERJ3GEYJ622	6.2k	
R89	ERJ3GEY0R00	0	
R90	ERJ3GEYJ224	220k	
R92	ERJ3GEYJ104	100k	
R93	ERJ3GEYJ104	100k	
R95	ERJ3GEYJ224	220k	
R102	ERJ3GEYJ102	1k	
R103	ERJ3GEYJ101	100	
R104	ERJ3GEYJ222	2.2k	
R105	ERJ3GEYJ222	2.2k	
R110	ERJ3GEYJ823	82k	
R112	ERJ3GEYJ472	4.7k	
R114	ERJ3GEYJ101	100	
R118	ERJ3GEYJ104	100k	
R119	ERJ3GEYJ563	56k	
R120	ERJ3GEYJ222	2.2k	
R121	ERJ3GEYJ123	12k	
R122	ERJ3GEYJ103	10k	
R123	ERJ3GEYJ114	110k	
R124	ERJ3GEYJ154	150k	
R125	ERDS2TJ4R7	4.7	
R126	ERJ3GEYJ471	470	
R127	ERJ3GEYJ152	1.5k	
R128	ERJ3GEYJ562	5.6k	
R129	ERJ3GEYJ152	1.5k	
R130	ERJ3GEYJ103	10k	
R131	ERJ3GEYJ223	22k	
R132	ERJ3GEYJ392	3.9k	
R133	ERJ3GEYJ102	1k	
R134	ERJ3GEYJ822	8.2k	
R135	ERJ3GEYJ822	8.2k	
R136	ERJ3GEYJ473	47k	
R137	ERJ3GEY0R00	0	
R138	ERJ3GEYJ103	10k	
R139	ERJ3GEYJ103	10k	
R141	ERJ3GEY0R00	0	
R142	ERJ3GEYJ103	10k	
R143	ERJ3GEY0R00	0	
R144	ERJ3GEYJ914	910k	
R145	ERJ3GEYJ103	10k	
R146	ERJ3GEYJ683	68k	
R147	ERJ3GEYJ104	100k	
R149	ERJ3GEYJ103	10k	
R150	ERJ3GEYJ102	1k	
R151	ERJ3GEYJ103	10k	
R152	ERJ3GEYJ124	120k	
R153	ERJ3GEYJ513	51k	
R154	ERJ3GEYJ682	6.8k	
R155	ERJ3GEYJ273	27k	
R156	ERJ3GEYJ683	68k	
R157	ERJ3GEYJ392	3.9k	
R158	ERJ3GEYJ513	51k	
R159	ERJ3GEYJ473	47k	
R160	ERJ3GEYJ393	39k	
R161	ERJ3GEYJ473	47k	
R162	ERJ3GEYJ682	6.8k	
R163	ERJ3GEYJ684	680k	
R164	ERJ3GEYJ221	220	
R165	PQ4R10XJ103	10k	

Ref. No.	Part No.	Part Name & Description	Remarks
R166	PQ4R10XJ103	10k	
R167	ERJ3GEY0R00	0	
R168	ERJ3GEYJ101	100	
R169	ERJ3GEYJ101	100	
R171	ERJ3GEY0R00	0	
R172	ERJ3GEYJ473	47k	
R191	ERJ3GEYJ104	100k	
R193	ERDS1TJ561	560	
		(CAPASITORS)	
C4	ECQE2E474KZ	0.47	S
C5	ECQE2104KF	0.1	
C6	ERDS2TJ000	0	
C11	ECUV1H103KBV	0.01	
C12	ECKD2H681KB	680P	S
C13	ECKD2H681KB	680P	S
C16	PQCUV1H332KB	0.0033	
C17	ECEA1EK470	47	S
C19	ECEA1EKS330	33	S
C23	PQCUV1H104ZF	0.1	
C25	ECEV1CV100	10	S
C27	PQCUV1E333MD	0.033	S
C29	ECEA1CKS470	47	
C32	PQCUV1C683MD	0.068	
C33	ECEA1HKS2R2	2.2	
C34	ECUV1C104KBV	0.1	S
C35	ECUV1H122KBV	0.0012	
C37	ECEA1HU4R7	4.7	
C38	ECEA1HU4R7	4.7	
C43	ECUV1C104KBV	0.1	
C44	PQCUV1E104MD	0.1	S
C46	ECUV1H680JCV	68P	
C47	PQCUV1E104MD	0.1	S
C48	PQCUV1C224KB	0.22	
C50	ECUV1H151JCV	150P	
C52	ECUV1H151JCV	150P	
C53	PQCUV1E104MD	0.1	S
C56	ECEA1CKS100	10	
C57	PQCUV1C224KB	0.22	
C59	ECEA1CKS100	10	
C64	PQCUV1E104MD	0.1	S
C67	ECEA1CKS100	10	
C68	PQCUV1E104MD	0.1	S
C69	ERJ3GEYJ103	10k	
C70	ERJ3GEYJ103	10k	
C72	ECUV1H103KBV	0.01	
C73	ECUV1H103KBV	0.01	
C74	ECEA1AU101	100	S
C76	ECUV1H221JCV	220P	S
C77	ECUV1H103KBV	0.01	
C78	ERJ3GEYJ103	10k	
C79	PQCUV1C683MD	0.068	
C80	ECUV1C104KBV	0.1	S
C81	ECEA0JKS101	100	
C82	ECUV1H103KBV	0.01	
C83	PQCUV1H123MD	0.012	S
C84	ECEA1HU4R7	4.7	
C85	ECEA0JK221	220	S
C86	PQCUV1H103KB	0.01	
C87	ECUV1H272KBV	0.0027	

Ref. No.	Part No.	Part Name & Description	Remarks
C88	PQCUV1H105JC	1	S
C89	ECUV1H103KBV	0.01	
C90	PQCUV1H105JC	1	S
C91	PQCUV1C224KB	0.22	
C93	PQCUV1E223KB	0.022	
C94	PQCUV1E223KB	0.022	
C95	ECUV1H182KBV	0.0018	
C96	PQCUV1H104ZF	0.1	
C98	ECUV1H103KBV	0.01	
C100	PQCUV1C224KB	0.22	
C102	ECUV1H330JCV	33P	
C103	PQCUV1H103KB	0.01	
C104	ECUV1H181JCV	180P	
C106	PQCUV1H105JC	1	S
C107	ECEV0JA101	100	
C110	ECEA1AU101	100	S
C111	PQCUV1H105JC	1	S
C112	ECEA1EU470	47	S
C113	PQCUV1E104MD	0.1	S
C114	ECEA1AU101	100	S
C115	PQCUV1H393KB	0.039	
C116	PQCUV1E104MD	0.1	S
C117	ECUV1H221JCV	220P	S
C118	ECUV1H560JCV	56P	
C119	PQCUV1H103KB	0.01	
C120	PQCUV1C683MD	0.068	
C121	PQCUV1H681JC	680P	S
C122	PQCUV1E104MD	0.1	S
C123	PQCUV1C224KB	0.22	
C124	ECUV1H221JCV	220P	S
C125	ECUV1H151JCV	150P	
C126	PQCUV1C334KB	0.33	
C127	ECUV1C104KBV	0.1	
C128	ECEA1HU100	10	
C129	PQCUV1H104ZF	0.1	
C131	ECEA1VKA330	33	
C132	ECEA1EKS330	33	S
C134	PQCUV1H103KB	0.01	
C140	PQCUV1H103KB	0.01	
C143	ECUV1C104KBV	0.1	S
C144	PQCUV1H104ZF	0.1	
C147	ECEA1AU101	100	S
C148	ECEA1AU101	100	S
C164	PQCUV1H104ZF	0.1	
		(PHOTO ELECTRIC TRANSDUCERS)	
PC2	PQVITLP620K	PHOTO ELECTRIC TRANSDUCER	⚠
PC3	PQVIPS2532-1	PHOTO ELECTRIC TRANSDUCER	⚠ S
PC5	PQVIPC817CD	PHOTO ELECTRIC TRANSDUCER	⚠
PC6	PQVIPC817CD	PHOTO ELECTRIC TRANSDUCER	⚠
PC7	PQVIPS2532-1	PHOTO ELECTRIC TRANSDUCER	⚠ S
PC8	PQVIPC817CD	PHOTO ELECTRIC TRANSDUCER	⚠
		(VARISTORS)	
SA1	PQVDRA311PT3	VARISTOR	⚠ S
SA2	PFRZ001Z	VARISTOR	⚠
ZNR1	ERZVA7D121	VARISTOR	

Ref. No.	Part No.	Part Name & Description	Remarks
		(TRANSFORMERS)	
T1	PFLT8E003	TRANSFORMER	⚠
T2	PFLT8E004	TRANSFORMER	⚠
		(COMPONENTS PARTS)	
L3	EXCELDR35	COMPONENTS PARTS	
RA1	EXRV8V101JV	COMPONENTS PARTS	
RA2	EXRV8V101JV	COMPONENTS PARTS	
		(RELAYS)	
RLY1	ATXD20328	RELAY	⚠
		(SWITCH)	
SW3	PFSH1A02Z	SWITCH, PUSH	
		(FUSE)	
F1	PQBA1N10NMAL	FUSE	

7.4. OPERATION BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB3	PFLP1184GZ	OPERATION BOARD ASS´Y (RTL)	⚠
		(ICS)	
IC301	MN53007QAF	IC	
		(DIODES)	
D363	1SS119	DIODE(SI)	
D364	1SS119	DIODE(SI)	
LED301	PQVDR325CA47	DIODE(SI)	S
LED302	PQVDR325CA47	DIODE(SI)	S
LED303	PQVDR325CA47	DIODE(SI)	S
		(CONNECTORS)	
CN301	PQJP11G43Y	"CONNECTOR, 11P"	
CN302	PQJS10X59Z	"CONNECTOR, 10P"	
		(RESISTORS)	
R307	ERJ3GEYJ181	180	
R308	ERJ3GEYJ181	180	
R309	ERJ3GEYJ181	180	
R310	ERJ3GEYJ101	100	
R311	ERJ3GEYJ181	180	
R312	ERJ3GEYJ181	180	
R322	ERJ3GEYJ122	1.2k	
R323	ERJ3GEYJ273	27k	
R332	ERJ3GEYJ471	470	
R333	ERJ3GEYJ471	470	
R334	ERJ3GEYJ471	470	

Ref. No.	Part No.	Part Name & Description	Remarks
R341	ERJ3GEYJ181	180	
R342	ERJ3GEYJ181	180	
R343	ERJ3GEYJ181	180	
R344	ERJ3GEYJ181	180	
R345	ERJ3GEYJ181	180	
R346	ERJ3GEYJ181	180	
R347	ERJ3GEYJ181	180	
R348	ERJ3GEYJ181	180	
R361	ERJ3GEYJ181	180	
R362	ERJ3GEYJ181	180	
R363	ERJ3GEYJ103	10k	
R364	ERJ3GEYJ103	10k	
R366	ERJ3GEYJ181	180	
R381	ERJ3GEYJ563	56k	
R382	ERJ3GEYJ331	330	
R383	ERJ3GEYJ331	330	
R384	ERJ3GEYJ331	330	
R385	ERJ3GEYJ101	100	
R391	ERJ3GEY0R00	0	
R396	ERJ3GEYJ102	1k	
R397	ERJ3GEYJ102	1k	
R398	ERJ3GEYJ103	10k	
		(CAPASITORS)	
C302	ECEA1AKS101	100	
C305	ECUV1H122KBV	0.0012	
C306	ECUV1H331JCV	330P	
C307	ECUV1H331JCV	330P	
C309	ECUV1H331JCV	330P	
C310	ECUV1H331JCV	330P	
C322	ECUV1C104KBV	0.1	S
C331	ECUV1C104KBV	0.1	S
C351	ECUV1C104KBV	0.1	S
C352	ECUV1C104KBV	0.1	S
		(PHOTO ELECTRIC TRANSDUCERS)	
PI301	CNA1006N	PHOTO ELECTRIC TRANSDUCER	
PI302	CNA1006N	PHOTO ELECTRIC TRANSDUCER	
PI303	CNA1006N	PHOTO ELECTRIC TRANSDUCER	
		(SWITCHES)	
SW301	PQSH1A105Z	SWITCH	S
SW302	PQSH1A105Z	SWITCH	S
SW303	PQSH1A105Z	SWITCH	S
SW304	PQSH1A105Z	SWITCH	S
SW305	PQSH1A105Z	SWITCH	S
SW306	PQSH1A105Z	SWITCH	S
SW307	PQSH1A105Z	SWITCH	S
SW308	PQSH1A105Z	SWITCH	S
SW309	PQSH1A105Z	SWITCH	S
SW310	PQSH1A105Z	SWITCH	S
SW311	PQSH1A105Z	SWITCH	S
SW312	PQSH1A105Z	SWITCH	S
SW313	PQSH1A105Z	SWITCH	S
SW314	PQSH1A105Z	SWITCH	S
SW315	PQSH1A105Z	SWITCH	S

Ref. No.	Part No.	Part Name & Description	Remarks
SW316	PQSH1A105Z	SWITCH	S
SW317	PQSH1A105Z	SWITCH	S
SW318	PQSH1A105Z	SWITCH	S
SW319	PQSH1A105Z	SWITCH	S
SW320	PQSH1A105Z	SWITCH	S
SW321	PQSH1A105Z	SWITCH	S
SW322	PQSH1A105Z	SWITCH	S
SW323	PQSH1A105Z	SWITCH	S
SW324	PQSH1A105Z	SWITCH	S
SW325	PQSH1A105Z	SWITCH	S
SW326	PQSH1A105Z	SWITCH	S
SW327	PQSH1A105Z	SWITCH	S
SW328	PQSH1A105Z	SWITCH	S
SW329	PQSH1A105Z	SWITCH	S
SW330	PQSH1A105Z	SWITCH	S
SW331	PQSH1A105Z	SWITCH	S
SW332	PQSH1A105Z	SWITCH	S
SW333	PQSH1A105Z	SWITCH	S
SW334	PQSH1A105Z	SWITCH	S
SW336	PQSH1A105Z	SWITCH	S
SW337	PQSH1A105Z	SWITCH	S
SW350	EVQVEHF1712B	SWITCH	

7.5. POWER SUPPLY BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB4	PFLP1206EZL	POWER SUPPLY BOARD ASS´Y (RTL)	⚠
		(ICs)	
IC101	PFVIFA5317P	IC	
IC202	PFVINJM2360A	IC	
		(TRANSISTORS)	
Q101	PFVTFS5KM16A	TRANSISTOR(SI)	⚠
Q201	2SC1740S	TRANSISTOR(SI)	
		(DIODES)	
D101	PFVD1N4005	DIODE(SI)	⚠
D102	PFVD1N4005	DIODE(SI)	⚠
D103	PFVD1N4005	DIODE(SI)	⚠
D104	PFVD1N4005	DIODE(SI)	⚠
D105	PFVDEG01C	DIODE(SI)	
D106	MA165	DIODE(SI)	
D107	PQVDERA1802	DIODE(SI)	
D108	MA4220	DIODE(SI)	
D109	PQVDERA1506	DIODE(SI)	
D110	MA4220	DIODE(SI)	
D201	PFVDSF5LC20U	DIODE(SI)	
D202	MA4075M	DIODE(SI)	
D203	PQVDERA81004	DIODE(SI)	
D204	MA4075M	DIODE(SI)	
D205	MA165	DIODE(SI)	
		(CONNECTORS)	
CN31	PQJP2D98Z	CONNECTOR	⚠
CN301	PQJP6G100Z	CONNECTOR	⚠

Ref. No.	Part No.	Part Name & Description	Remarks
CN302	PQJS08A36Z	CONNECTOR	⚠
		(COILS)	
L101	ELF18D290	COIL	
L102	ELF18D290	COIL	
L103	EXCELDR35	COIL	
L201	PFLEC10	COIL	
L202	PQLQ681388A	COIL	
L204	PQLE53	COIL	
		(VARISTORS)	
ZNR101	ERZV10DK750U	VARISTOR	⚠
ZNR102	ERZV10DK471U	VARISTOR	⚠
ZNR103	ERZV10DK471U	VARISTOR	⚠
		(PHOTO COUPLER)	
PC101	0N3171	PHOTO COUPLER	
		(RESISTORS)	
R101	ERDS1J105	1M	
R102	ERDS2TJ823	82k	
R103	ERDS2TJ823	82k	
R104	ERG2SJ104	100k	
R105	ERX2SJR22	0.22	
R106	ERDS2FJ100	10	
R107	ERDS2SJ470	47	
R108	ERDS2FJ150	15	
R109	ERG1SJ470	47	
R121	PQ4R10XJ103	10k	
R122	PQ4R10XJ471	470	
R123	PQ4R10XJ182	1.8k	
R124	PQ4R10XJ181	180	
R125	PQ4R10XJ101	100	
R126	PQ4R10XJ562	5.6k	
R127	PQ4R10XJ222	2.2k	
R201	ERG1SJR33	0.33	
R202	ERD2STJ682	6.8k	
R204	ERD2STJ104	100k	
R221	PQ4R10XJ182	1.8k	
R222	PQ4R10XJ102	1k	
R223	PQ4R10XJ562	5.6k	
R224	PQ4R10XJ223	22k	
R225	PQ4R10XJ123	12k	
R227	PQ4R10XJ392	3.9k	
R228	PQ4R10XJ122	1.2k	
		(CAPACITORS)	
C101	ECQU2A104MV	0.1	⚠
C102	ECQU2A104MV	0.1	⚠
C103	PFKDE2GA102K	0.001	⚠
C104	PFKDE2GA102K	0.001	⚠
C105	ECKDNA222ME	0.0022	⚠
C106	PFCEA400S560	56P	
C107	ECKD3A470KBP	47P	
C108	ECKD3A102KBP	0.001	
C109	ECA1VHG470	47P	
C110	ECKDNA222ME	0.0022	

Ref. No.	Part No.	Part Name & Description	Remarks
C121	ECUV1H472KBN	0.0047	
C122	ECUV1C224KBX	0.22	
C123	ECUV1H561KBM	560P	
C124	ECUV1H473KBX	0.047	
C201	EEUFA1V471	470P	
C202	ECKD3A102KBP	0.001	
C203	ECQV1H104JZ	0.1	
C204	PQCEA10B1000	1000P	
C221	ECUV1E104KBW	0.1	
C223	ECUV1H271KBN	270P	
C224	ECUV1E104KBW	0.1	
		(FUSE)	
F101	PFBA215005	FUSE	⚠
F201	PFBA19372	FUSE	
		(OTHERS)	
L103	EXCELDR35	COMPONENTS PARTS	
RL201	PFSLDG24D1	RELAY	
TH101	PFRRTM8R207C	THERMISTOR	
T101	ETS29AE138A	TRANSFORMER	
VR201	EVNDJAA03B53	VARIABLE RESISTOR	⚠

7.6. CCD BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB5	PFWP2FP200M	CCD BOARD ASS´Y (RTL)	
		(ICs)	
IC801	PFWP2FP200M	CCD BOARD ASS´Y (RTL)	
		(TRANSISTORS)	
Q801	2SB1218A	TRANSISTOR(SI) (or 2SA1576R)	
Q802	2SB1218A	TRANSISTOR(SI) (or 2SA1576R)	
Q803	2SD1819A	TRANSISTOR(SI) (or 2SC4155S)	
		(CONNECTOR)	
CN801	PQJP8G30Y	CONNECTOR, 8P	
		(CAPACITORS)	
C801	PQCUV1E104MD	0.1	
C803	ECEA1CKS101	100	
C804	PQCUV1E104MD	0.1	
		(RESISTORS)	
J801	PQ4R18XJ000	0	
J802	PQ4R10XJ000	0	
J803	PQ4R10XJ000	0	
R801	PQ4R10XJ202	2k	S
R802	PQ4R10XJ202	2k	S
R803	PQ4R10XJ100	10	S
R804	PQ4R10XJ242	2.4k	S
R805	PQ4R10XJ272	2.7k	S
R806	PQ4R10XJ242	2.4k	S
R807	PQ4R10XJ272	2.7k	S
R808	PQ4R10XJ471	470	S
R809	PQ4R10XJ471	470	S
R810	PQ4R10XJ681	680	S
R811	PQ4R10XJ101	100	S
R812	PQ4R10XJ101	100	S
R830	PQ4R10XJ000	0	S
		(VARIABLE RESISTOR)	
VR801	EVNDXAA03B23	SEMI-FIXED RESISTOR, 2k	

7.7. HOOK BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB6	PFLP1130MZ	HOOK SW/SENSOR BOARD ASS´Y (RTL)	
		(IC)	
IC401	PQVIBA12003	IC	S
IC402	PQVIBA12003	IC	S
		(TRANSISTOR)	
Q401	2SB1322	TRANSISTOR(SI) (or 2SB1237R)	S
Q402	2SB1322	TRANSISTOR(SI) (or 2SB1237R)	S
		(DIODES)	
D401	1SS147	DIODE(SI)	
D402	MA7200	DIODE(SI)	S
D403	1SS147	DIODE(SI)	
D404	MA7200	DIODE(SI)	S
		(CONNECTORS)	
CN401	PQJP5G30Y	CONNECTOR, 5P	
CN402	PQJP9G30Y	CONNECTOR, 9P	
CN403	PQJP09G100Z	CONNECTOR, 9P	
CN404	PQJP02G100Z	CONNECTOR, 2P	
CN405	PQJP5G30Y	CONNECTOR, 5P	
CN406	PQJP03G100Z	CONNECTOR, 3P	
CN407	PQJP3G30Y	CONNECTOR, 3P	
CN408	PQJP3G38Z	CONNECTOR, 3P	
		(CAPACITOR)	
C401	ECEA1VKA220	22	
		(FUSE)	
F401	PQBA1N025NMA	FUSE	
		(PHOTO ELECTRIC TRANSDUCERS)	
PI401	CNA1006N	SENSOR	S
PI402	CNA1006N	SENSOR	S
PI403	PQVIPS4506	SENSOR	S
		(RESISTORS)	
R401	ERDS2TJ821	820	
R402	ERDS2TJ332	3.3K	
R403	ERDS2TJ821	820	
R404	ERDS2TJ332	3.3K	

Ref. No.	Part No.	Part Name & Description	Remarks
		(SWITCH)	
SW401	ESE14A211	SWITCH, HOOK	

7.8. FIXTURES AND TOOLS

Ref. No.	Part No.	Part Name & Description	Remarks
EC1	PQZZ2K6Z	EXTENSION CORD, 2P	
EC2	PQZZ2K12Z	EXTENSION CORD, 2P	
EC3	PQZZ2K13Z	EXTENSION CORD, 2P	
EC4	PQZZ3K5Z	EXTENSION CORD, 3P	
EC5	PQZZ3K7Z	EXTENSION CORD, 3P	
EC6	PQZZ3K12Z	EXTENSION CORD, 3P	
EC7	PFZZ5K13Z	EXTENSION CORD, 5P	
EC8	PQZZ8K15Z	EXTENSION CORD, 8P	
EC9	PQZZ8K18Z	EXTENSION CORD, 8P	
EC10	PQZZ8K18Z	EXTENSION CORD, 8P	
EC11	PFZZ8K23Z	EXTENSION CORD, 8P	
EC12	PQZZ9K4Z	EXTENSION CORD, 9P	
EC13	PQZZ6K14Z	EXTENSION CORD, 6P	
EC14	PQZZ11K4Z	EXTENSION CORD, 11P	
EC15	PQZZ11K8Z	EXTENSION CORD, 11P	
EC16	PQZZ7K11Z	EXTENSION CORD, 7P	
	PFZZ1F780M	CCD TOOL (See 3 ADJUSTMENTS.)	
	PFZZFP200M	SENSOR BOARD TOOL	
		(See Ref. No. 6 in 4 DISASSEMBLY INSTRUCTIONS.)	
	PFZZFP320E	VOICE PROMPT ROM	
		(See FLASH MEMORY (IC509) in 2.3.3.4.1. Digital Board Section.	
	KM79811245C0	BASIC FACSIMILE TECHNIQUE	
		(for training service technicians)	

Note:

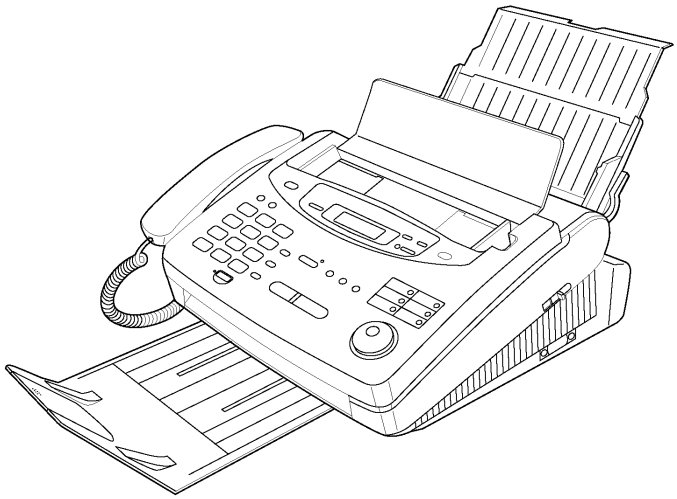
Tools and Extension Cords are useful for servicing.

(They make servicing easy.)

HK(Q) KXFM330GR
Printed in Japan

.ORDER NO. KM79908300C2

Service Manual



KX-FP320G
KX-FM330G

Plain Paper FAX with Telephone Answering System/Multi-Function Plain Paper FAX

(for Germany)

⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public.
It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

When you note the serial number,write down all 11 digitals. The serial number may be found on the bottom of the unit.

Panasonic

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CONTENTS

Page

1 INTRODUCTION ... 3
1.1. SAFETY PRECAUTIONS ... 3
1.2. INSULATION RESISTANCE TEST ... 3
1.3. FOR SERVICE TECHNICIANS ... 3
1.4. BATTERY CAUTION ... 4
1.5. AC CAUTION ... 4
1.6. PERSONAL SAFETY PRECAUTIONS ... 5
1.7. PRECAUTIONS FOR SERVICE ... 6
1.8. FEATURES ... 7
1.9. SPECIFICATIONS ... 8
1.10. OPTIONAL ACCESSORIES ... 8
1.11. CCITT No. 1 Test Chart (Actual size) ... 9
1.12. LOCATION OF CONTROLS ... 10
1.13. CONNECTIONS ... 11
1.14. INSTALLATION ... 13
1.15. MAINTENANCE ITEMS AND COMPONENT LOCATIONS ... 22

2 TROUBLESHOOTING GUIDE ... 25
2.1. TROUBLESHOOTING SUMMARY ... 25
2.2. USER RECOVERABLE ERRORS ... 26
2.3. TROUBLESHOOTING DETAILS ... 29
2.4. PROGRAMMING AND LISTS ... 102
2.5. TEST FUNCTIONS ... 111

3 ADJUSTMENTS ... 117
3.1. TABLE OF TEST EQUIPMENTS AND TOOLS ... 117
3.2. ADJUSTING THE FEEDER PRESSURE ... 117
3.3. CCD ADJUSTMENTS ... 118
3.4. DOCUMENT READ START POSITION ADJUSTMENT ... 123

4 DISASSEMBLY INSTRUCTIONS ... 124

5 HOW TO REPLACE THE FLAT PACKAGE IC ... 134
5.1. PREPARATION ... 134
5.2. FLAT PACKAGE IC REMOVAL PROCEDURE ... 134
5.3. FLAT PACKAGE IC INSTALLATION PROCEDURE ... 135
5.4. BRIDGE MODIFICATION PROCEDURE ... 135

6 CIRCUIT OPERATIONS ... 136
6.1. CONNECTION DIAGRAM ... 136
6.2. GENERAL BLOCK DIAGRAM ... 137
6.3. CONTROL SECTION ... 139
6.4. FACSIMILE SECTION ... 150
6.5. SENSORS AND SWITCHES ... 158
6.6. MODEM SECTION ... 162
6.7. RS-232C SECTION : RS-232C serial communication (KX-FM330 Only) ... 169
6.8. DESCRIPTION OF BLOCK DIAGRAM IN ANALOG SECTION ... 170
6.9. NCU SECTION ... 172
6.10. ITS (Integrated telephone System) and MONITOR SECTION ... 175
6.11. ATAS (Automatic Telephone Answering System) SECTION ... 175
6.12. SPECIAL CIRCUIT ON THE ANALOG BOARD ... 176
6.13. ANALOG GATE ARRAY (IC5 on the Analog Board) ... 177
6.14. OPERATION BOARD SECTION ... 179
6.15. LCD SECTION ... 180
6.16. POWER SUPPLY BOARD SWITCHING SECTION ... 181

7 FOR THE SCHEMATIC DIAGRAMS ... 183

8 PRINTED CIRCUIT DIAGRAM ... 185
8.1. PRINTED CIRCUIT BOARD (DIGITAL BOARD : Bottom View) ... 185
8.2. PRINTED CIRCUIT BOARD (DIGITAL BOARD : Component View) ... 186
8.3. PRINTED CIRCUIT BOARD (ANALOG BOARD : Component View) ... 187
8.4. PRINTED CIRCUIT BOARD (ANALOG BOARD : Bottom View) ... 188
8.5. PRINTED CIRCUIT BOARD (OPERATION BOARD) ... 189
8.6. PRINTED CIRCUIT BOARD (SWITCHING POWER SUPPLY) ... 190

9 SCHEMATIC DIAGRAM (DIGITAL CIRCUIT) ... 191
9.1. SCHEMATIC DIAGRAM (DIGITAL CIRCUIT) ... 191
9.2. SCHEMATIC DIAGRAM (ANALOG CIRCUIT) ... 192
9.3. SCHEMATIC DIAGRAM (OPERATION CIRCUIT) ... 193
9.4. SCHEMATIC DIAGRAM (SWITCHING POWER SUPPLY) ... 194
9.5. SCHEMATIC DIAGRAM AND PRINTED CIRCUIT BOARD (CCD) ... 195
9.6. SCHEMATIC DIAGRAM/PRINTED CIRCUIT BOARD (SENSOR) ... 196

10 TERMINAL GUIDE OF THE ICS TRANSISTORS AND DIODES ... 197

11 FIXTURES AND TOOLS ... 198

12 CABINET, MECHANICAL AND ELECTRICAL PARTS LOCATION ... 199
12.1. PAPER CASSETTE SECTION ... 199
12.2. OPERATION PANEL SECTION ... 200
12.3. UPPER CABINET/P.C.B. SECTION ... 201
12.4. MECHANICAL SECTION ... 202
12.5. CCD UNIT SECTION ... 203
12.6. ACTUAL SIZE OF SCREWS AND WASHER ... 204

13 ACCESSORIES AND PACKING MATERIALS ... 205

14 REPLACEMENT PARTS LIST ... 206
14.1. CABINET AND ELECTRICAL PARTS ... 206
14.2. DIGITAL BOARD PARTS ... 207
14.3. ANALOG BOARD PARTS ... 214
14.4. OPERATION BOARD PARTS ... 217
14.5. POWER SUPPLY BOARD PARTS ... 218
14.6. CCD BOARD PARTS ... 219
14.7. HOOK BOARD PARTS ... 219
14.8. FIXTURES AND TOOLS ... 220
14.9. EXPLANATION OF CD-ROM SERVICE NUMBER ... 221

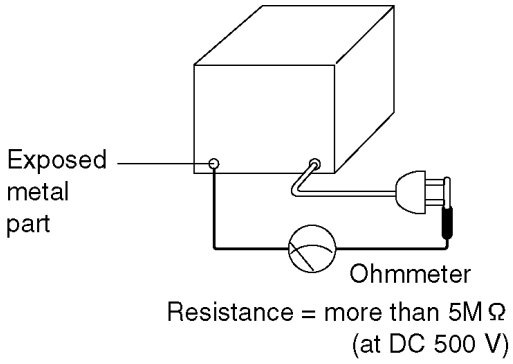
1 INTRODUCTION

1.1. SAFETY PRECAUTIONS

1. Before servicing, unplug the AC power cord to prevent an electric shock.
2. When replacing parts, use only the manufacturer´s recommended components.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to perform the following insulation resistance test to prevent the customer from being exposed to shock hazards.

1.2. INSULATION RESISTANCE TEST

1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with an ohmmeter between the jumpered AC plug and each exposed metal cabinet part (screwheads, control shafts, bottom frame, etc.).
   Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.
4. If the measurement is outside the specified limits, there is a possibility of a shock hazard.
   The equipment should be repaired and rechecked before it is returned to the customer.



1.3. FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity.

When repairing, the following precautions will help prevent recurring malfunctions.

1. Cover the plastic part´s boxes with aluminum foil.
2. Ground the soldering irons.
3. Use a conductive mat on the worktable.
4. Do not touch the IC or LSI pins with bare fingers.

1.4. BATTERY CAUTION

CAUTION

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to manufacturer's instruction.

Disposal of lithium batteries should be perfomed by permitted, professional disposal firms knowledgeable in state govem-ment federal and local hazardous materials and hazardous waste transportation and disposal requirements.
Battery continues to have no transportation limitations as long as they are separated to prevent short circuts and packed in strong packaging.
Commercial firms that dispose of any quantity of lithium cells should have a mechanism in place to account for their ulti-mate disposition. This is a good practice for all types of commercial or industrial waste.

Recommend Type Number:
CR2032 (BATT) Manufactured by MATSUSHITA
CR2032 (BATT) Manufactured by SONY

1.5. AC CAUTION

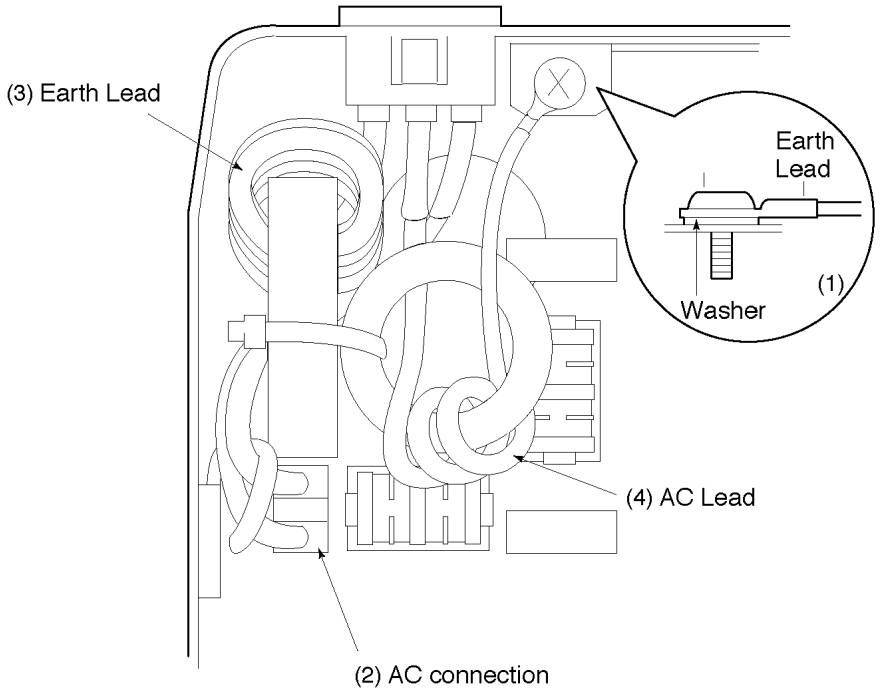
For safety, before closing the lower cabinet, please make sure of the following precautions.

(1) The earth lead is fixed with the screw.

(2) The AC connector is connected properly.

(3) Wrap the earth lead around the core 3 times.

(4) Wrap the AC lead around the core 2 time.

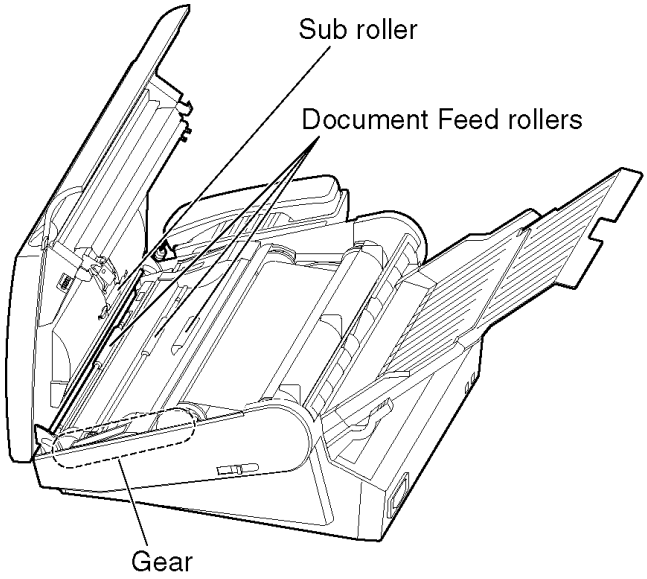


(BOTTOM VIEW)

1.6. PERSONAL SAFETY PRECAUTIONS

1.6.1. MOVING SECTIONS OF THE UNIT

Be careful not to let your hair, clothes, fingers, accessories, etc., become caught in any moving sections of the unit.
The moving sections of the unit are a roller and a gear. There are a separation roller and a document feed roller which are rotated by a document feed motor, and the gear rotates the two rollers. Be careful not to touch them accidentally by hand, especially when the unit is operating. .

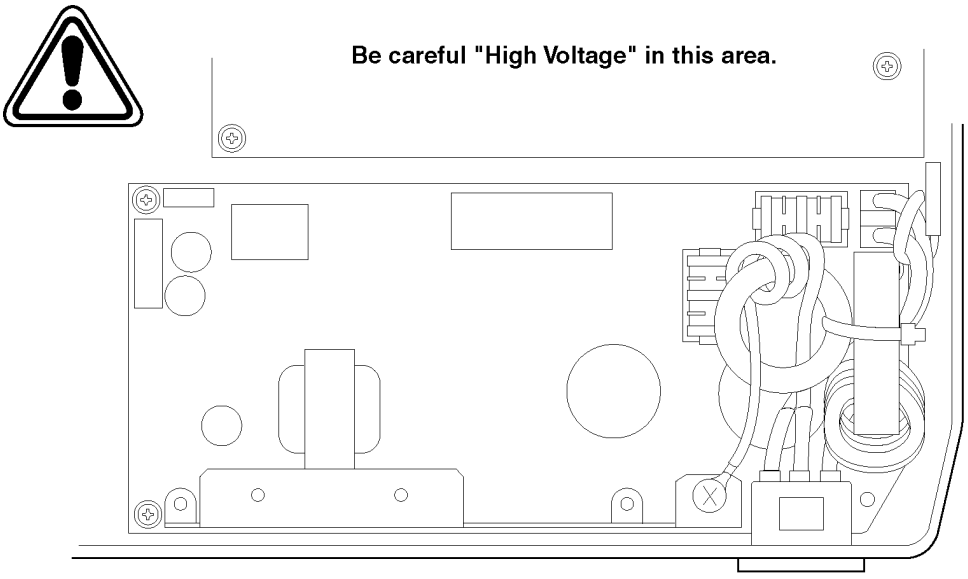


1.6.2. ELECTRICALLY LIVE SECTIONS

All the electrical sections of the unit supplied with AC power with the AC power cord are ellectrically live.
Never disassemble the unit for service with the AC power supply plugged in.

CAUTION:

AC voltage is supplied as is to the primary side of the power supply unit.Therefore, always unplug the AC power cord before disassembling for service.



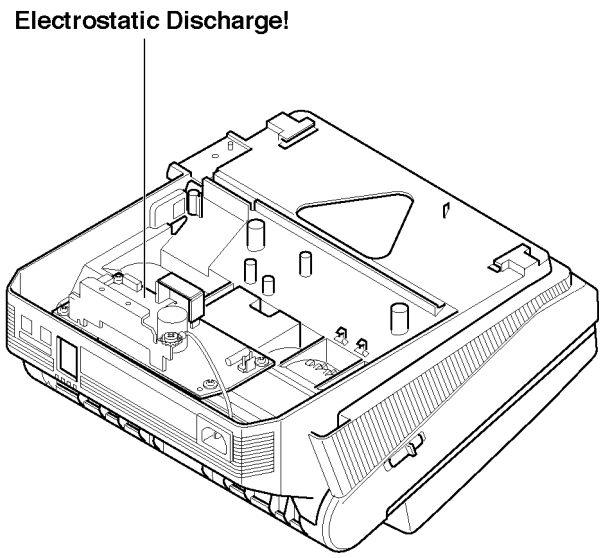
(Bottom View)

1.7. PRECAUTIONS FOR SERVICE

1.7.1. PRECAUTIONS TO PREVENT DAMAGE FROM STATIC ELECTRICITY

The electrical charge is accumulated on a person. For instance, clothes rub can damage electric elements or change their electrical characteristics. In order to prevent static electricity, make sure to touch some metallic part that is grounded to release the static electricity, never touch the electrical sections which are the power supply unit, etc.





1.8. FEATURES

General

- Help function

  Display:

  1. HOW TO SET UP
  2. JOG/AUTO DIAL
  3. TAD OPERATION
  4. FAX RECEIVING
  5. COPIER
  6. REPORTS
  7. CALLED ID

- LCD (Liquid Crystal Display) readout
- TAM (Telephone answering machine)

Digital Answering System

- Voice Time/Day Stamp
- 18-minutes recording time
- Voice and fax paper call

Plain Paper Facsimile Machine

- 8 second transmission speed *
- Letter/Legal, G3 compatible
- Automatic document feeder (15 sheets)
- 6 stations one-touch dialer
- Broadcast (up to 109 stations) ×1
- Resolution : Standard/Fine/Super fine/Half tone (64 level)
- LCD Contrast : Normal/Darker
- Delayed transmission
- Overseas transmission function
- Remote FAX receiving using an extension phone
- 150-sheet paper capacity
- Automatic fax/phone switching
- High speed 14400 dps fax modem
- Out of paper reception (up to 28 papers) **

* The 8 second speed is based upon the CCITT No. 1 Test Chart on the condition that memory transmission is performed.

** 350KB memory. Actual number of Pages depends upon the contents of the Pages and the resolution. 28-page capacity based upon CCITT No. 1 Test Chart at standard resolution.

Large Memory (28 pages) performed by DRAM

Approx. 28 pages of memory reception

Approx. 25 pages of memory transmission

Integrated Telephone System

- On-hook dialing
- Digital duplex speakerphone
- Voice muting
- Redialing function
- 100-Station telephone directory with Jog Dial
- One-Touch dial (5×2 Phone Numbers)

Copier function

- Multi-copy function (up to 99 copies)
- Enlargement and reduction
- Collate
- 64-Level halftone
- Electronic film indicator

PC fax

- Send and Receive Faxes from your PC.
- 500-name address book

Scanner

- 400dpi (interpolated) scanning capability
- Easy to use document Viewer
- Included OCR Plus Optical Character Recognition Software (Includes OCR Plus optional upgrade 30 days trial version)

1.9. SPECIFICATIONS

Applicable Lines:	Public Switched Telephone Network
Document Size:	Max. 216 mm in width
	Max. 600 mm in length
Effective Scanning Width:	208 mm
Recording Paper Size:	A4: 210 mm×297 mm
Effective Printing Width:	202 mm
Transmission Time*:	Approx. 8 sec./page (Original mode)
	Approx. 20 sec./page (G3 Normal mode)
Scanning Density:	Horizontal:
	8 pels/mm
	Vertical:
	3.85 lines/mm—STANDARD mode
	7.7 lines/mm —FINE/HALF TONE mode
	15.4 lines/mm—SUPER FINE Mode
Halftone Level:	64-level
Scanner Type:	CCD Image Sensor
Printer Type:	Thermal Transfer
Data Compression System:	Modified Huffman (MH), Modified READ (MR), Modified READ (MMR)
Modem Speed:	14400/12000/9600/7200/4800/2400 bps; Automatic Fallback
Operating Environment:	5—35°C, 20—80 % RH(Relative Humidity)
Dimensions (H×W×D):	154×365×355 mm
Mass (Weight):	Approx. 5.4 kg
Power Consumption:	Transmission: Approx. 14 W
	Reception: Approx. 37 W (When receiving a 20% black document)
	Copy: Approx. 48 W (When copying a 20% black document)
	Standby: Approx. 6 W
	Maximum: Approx. 160 W (When using a 100% black document)
Power Supply:	220-240 V AC, 50 Hz
Memory Capacity:	Voice memory : Approx. 18 minutes of recoding time including the greeting message**
	Fax memory: Approx. 28 pages of memory reception
	Approx. 25 pages of memory transmission (Based on the CCITT of No.1
	Test Chart in standard resolution, without using the Error Correction Mode.)

* Transmission speed depends upon the contents of the pages, resolution, telephone line conditions and capability of receiving unit. The 8 second speed based upon CCITT No.1 Test Chart. (Refer to **1.11. CCITT No.1 Test Chart.**)

** Based on CCITT No.1 Test Chart in standard resolution when the Error Correction Mode is set to OFF.

Any details given in these instructions are subject to change without notice.

The pictures and illustrations in these instructions may very slightly from the actual product.

1.10. OPTIONAL ACCESSORIES

Parts No.	Description	Comment
KX-FA135X	Film Cartridge	1 cartridge & film: 216mm X 100m (8 1/2"X328´) roll
KX-FA136X	Replacement film	2 films: 216mm X 100mm (8 1/2"X328´) roll

1.11. CCITT No. 1 Test Chart (Actual size)



THE SLEREXE COMPANY LIMITED

SAPORS LANE - BOOLE - DORSET - BH 25 8 ER

TELEPHONE BOOLE (945 13) 51617 - TELEX 123456

Our Ref. 350/PJC/EAC 18th January, 1972.

Dr. P.N. Cundall,
Mining Surveys Ltd.,
Holroyd Road,
Reading,
Berks.

Dear Pete,

Permit me to introduce you to the facility of facsimile transmission.

In facsimile a photocell is caused to perform a raster scan over the subject copy. The variations of print density on the document cause the photocell to generate an analogous electrical video signal. This signal is used to modulate a carrier, which is transmitted to a remote destination over a radio or cable communications link.

At the remote terminal, demodulation reconstructs the video signal, which is used to modulate the density of print produced by a printing device. This device is scanning in a raster scan synchronised with that at the transmitting terminal. As a result, a facsimile copy of the subject document is produced.

Probably you have uses for this facility in your organisation.

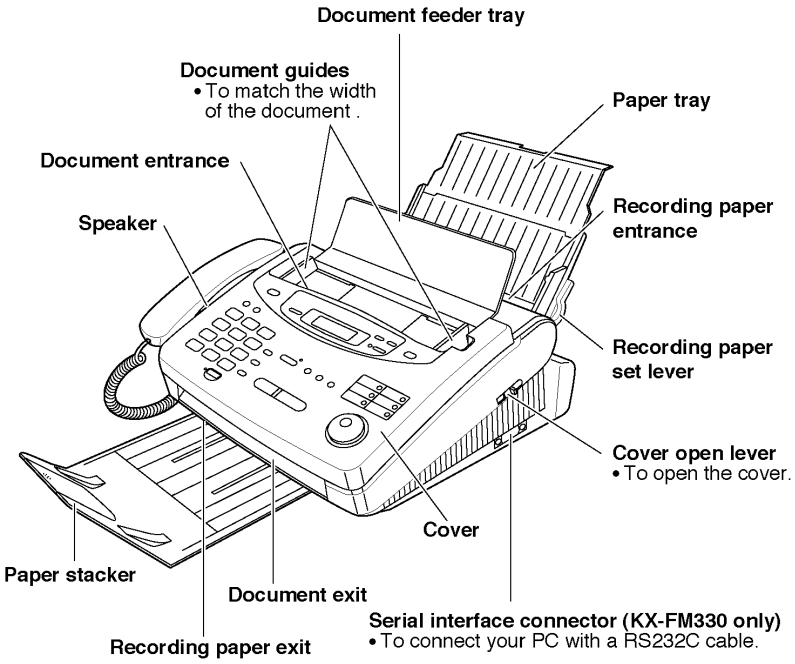
Yours sincerely,

Phil.

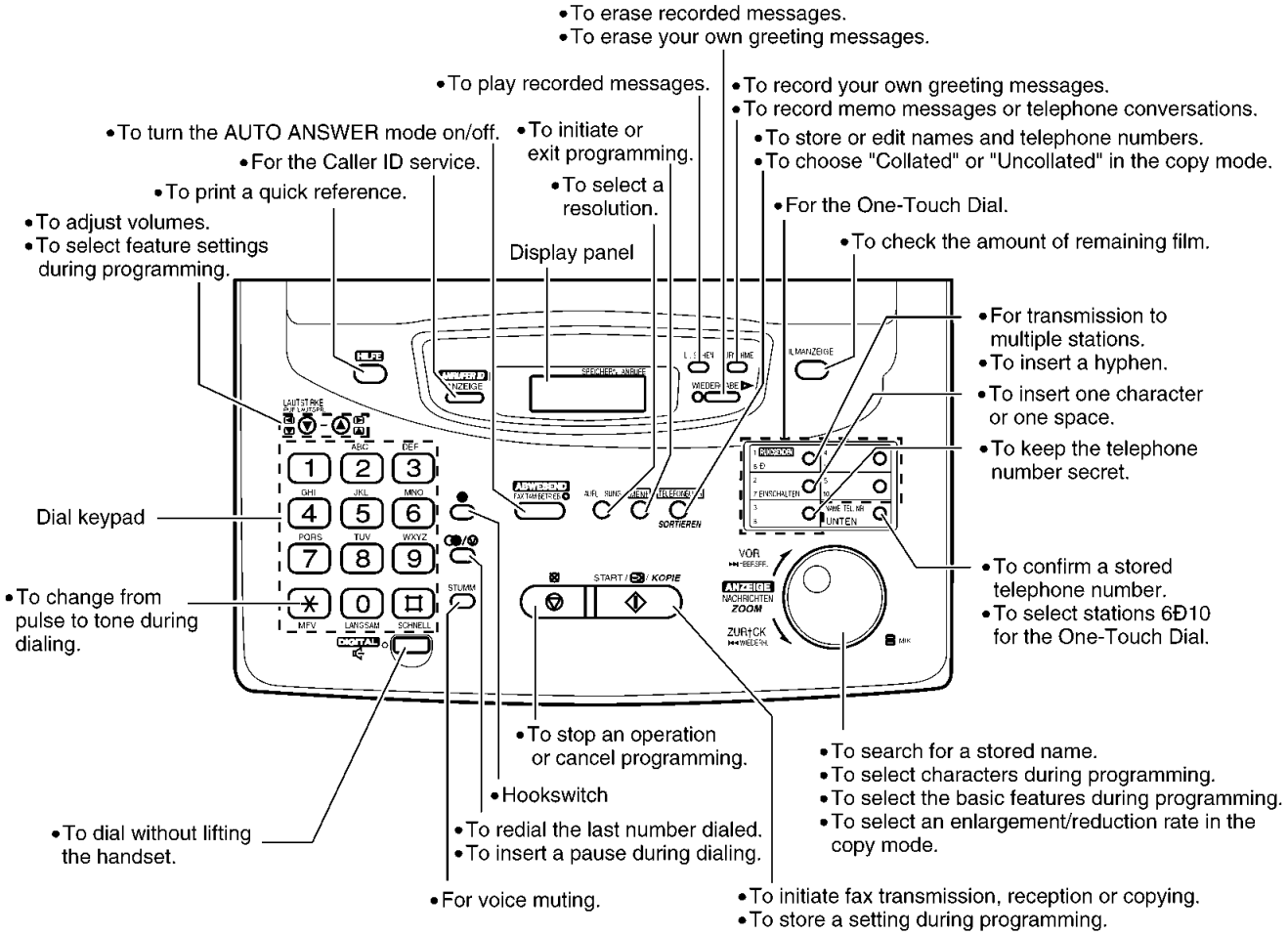
P.J. CROSS
Group Leader - Facsimile Research

1.12. LOCATION OF CONTROLS

1.12.1. OVERVIEW

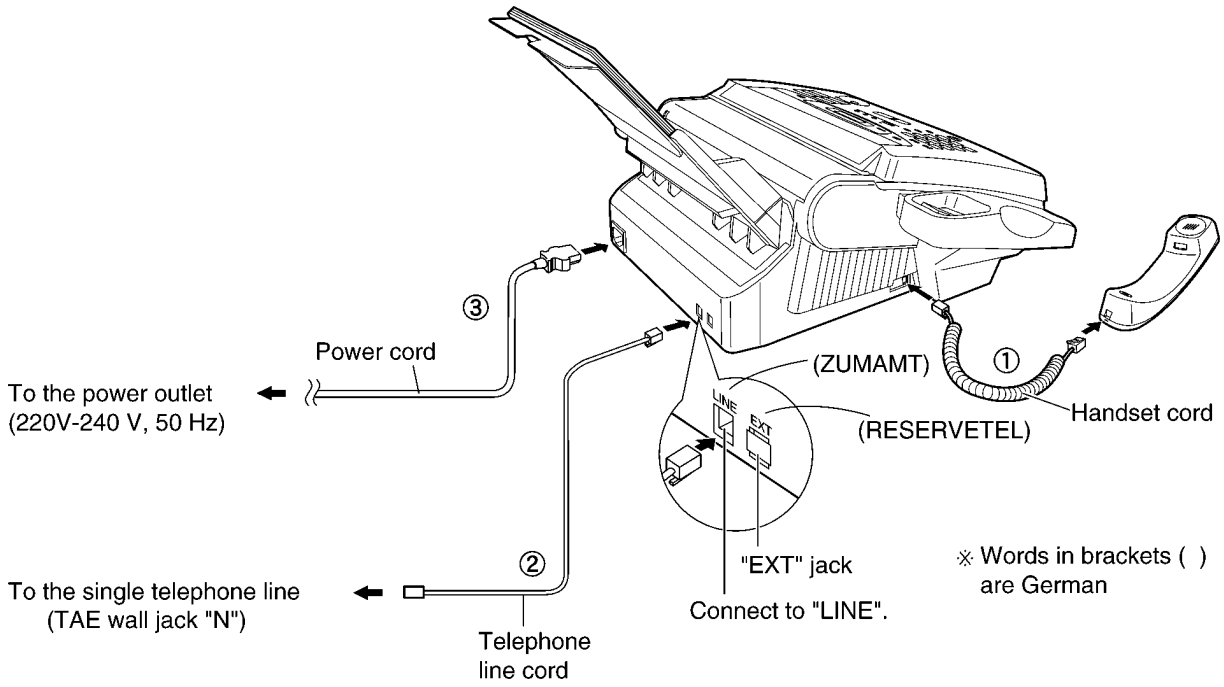


1.12.2. CONTROL PANEL



1.13. CONNECTIONS

1. **Connect the handset and handset cord.**
2. **Connect the telephone line cord.**
3. **Connect the power cord.**



Note:

1. For your safety, the power outlet should be near the unit and it should be always accessible during operation.
2. If following message appears after you switch on the unit, it means that the fax paper set lever has been released:

   Display: CHECK LEVER

   Please return it to its original position.
3. A "NF" TAE wall jack must be available at the place of installation of this unit. If such a standard connection plug is not available, please contact your PANASONIC dealer or your telephone company.
4. There should be no more than one answering machine and one telephone connected in series to this unit. In order to ensure a trouble-free operation, all connected devices should fulfill the DIN 44.015 specifications.
5. In case of a power failure, the unit can not operate. Thus we recommend the use of a spare telephone, connected to the jack, "EXT (RESERVETEL)".
6. If you use a telephone or an answering machine connected to the jack, "EXT (RESERVETEL)", please notice:

   (1) From the moment the telephone is operated or the answering machine answers a call, the following message appears:

   Display: EXT. IN USE

   (2) From the moment you accept a call by unhooking the handset of the Telefax unit, the connection to the jack "EXT (RESERVETEL)" is interrupted.

   (3) No sound can be heard on the handset of the extern telephone during the function of the Telefax unit.

   (4) In the TEL/FAX mode, calls are made through the Fax unit only. No calls can be answered on an external telephone.

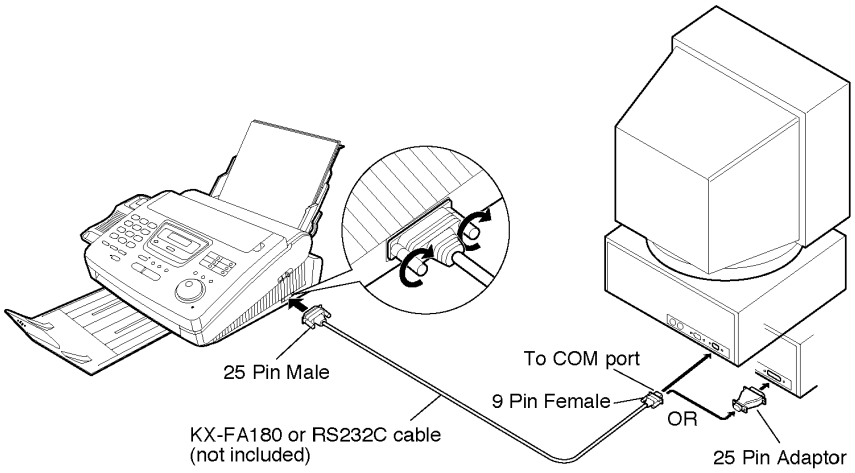
Following connections are possible:

1. Connecting a telephone to the jack, "EXT (RESERVETEL)". The additional connection of an answering machine is not possible because both lines are terminated.
2. If the unit is operated on a "NF" wall jack, you can connect an answering machine to the jack, " EXT (RESERVETEL)" or to the TAE wall jack, "N". You can connect an external telephone to the TAE "F".
3. If the unit is operated on a TAE jack "NFN", all devices can be connected without using the TAE jack will not be used.
4. To make use of the connection possibilities of the TAE wall line plug, you must connect the TAE adapter cord to the unit!

1.13.1. Conneting to a computer

To run the Multi-Function Center software, you need the following software and hardware.

- IBM PC 386, or higher, or compatible meeting all AT bus specifications (DX 33Mhz minimum recommended).
- Microsoft Windows 3.1, 3.11 or Windows 95.
- Hard disk drive with at least fourteen (14) MB of available storage.
- RS232C Serial Port.



Note:

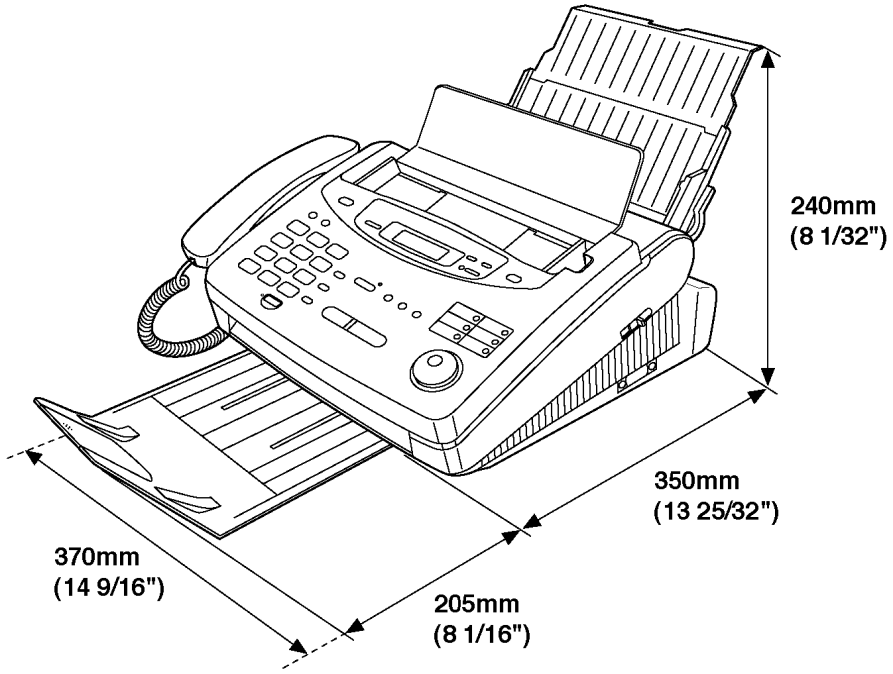
Please use a RS232C cable shorter than 3m.

1.14. INSTALLATION

1.14.1. INSTALLATION SPACE

The space required to install the unit is shown below.

The dimensions given are necessary for the unit to be operate efficiently.



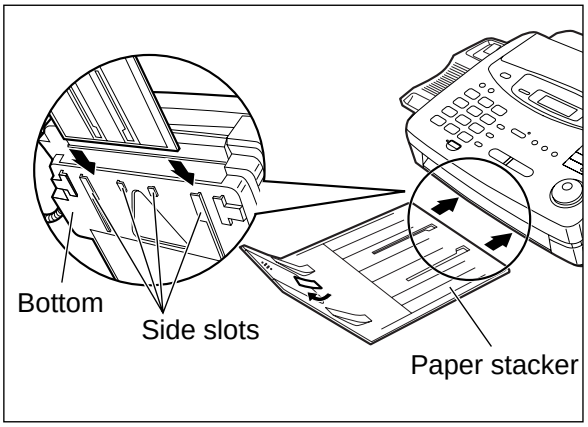
Note:

- Avoid excessive heat or humidity.
- Use the unit within the following ranges of temperature and humidity.
- Ambient temperature: 5°C to 35°C
- Relative humidity: 20% to 80% (without condensation)
- Power cord length should be less than 5 meters (16.4 feet). Using a longer cord may reduce the voltage or cause malfunctions.
- Avoid direct sunlight.
- Do not install near devices which contain magnets or generate magnetic fields.
- Do not subject the unit to strong physical shock or vibration.
- Keep the unit clean. Dust accumulation can prevent the unit from functioning properly.
- To protect the unit from damage, hold both sides when you move it.

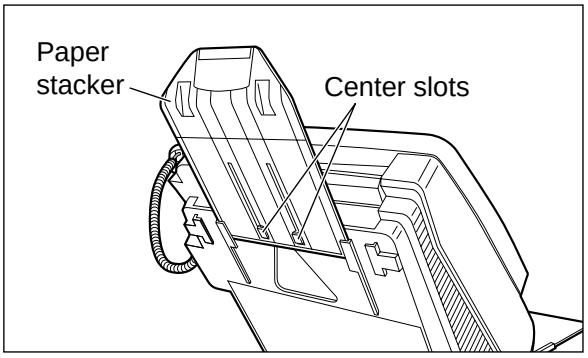
1.14.2. INSTALLING THE PAPER STACKER

1 Remove the shipping tape from the paper stacker.

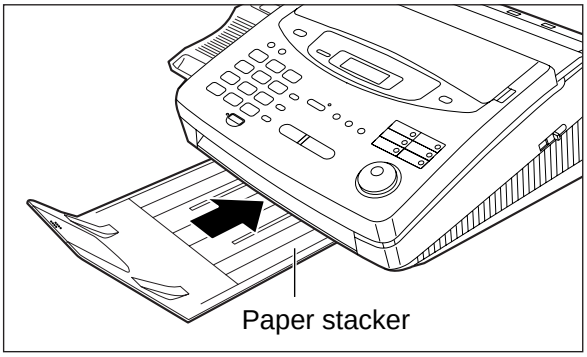
2 Lift the front of the unit and insert the paper stacker into the side slots.



3 Confirm if the paper stacker is locked into the center slots.



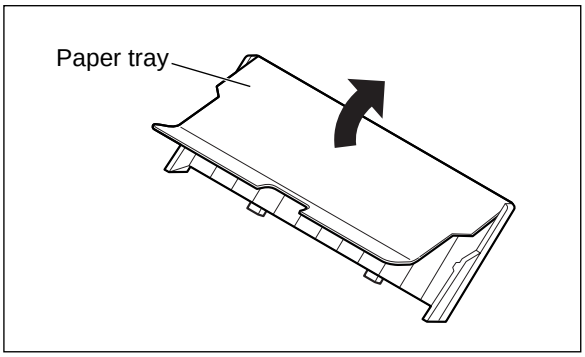
4 Slide the paper stacker until it stops.



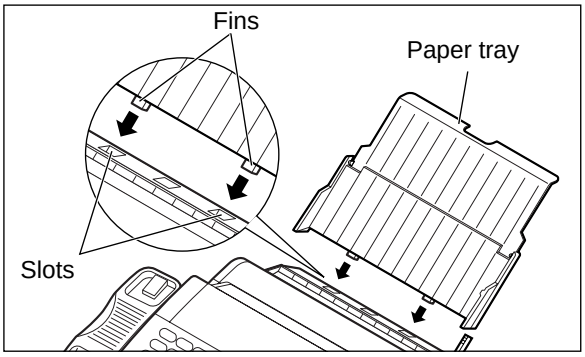
1.14.3. INSTALLING THE PAPER TRAY

The recording paper size that can be loaded is A4. The paper tray can hold up to 150 sheets of 75 g/m^2 (20 lb.) paper.
Use 60 to 90 g/m^2 (16 to 24 lb.) paper.

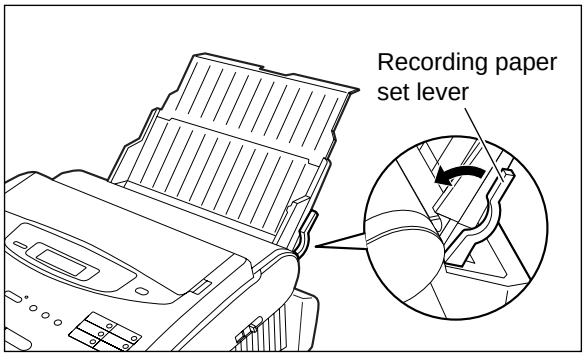
(1) Open the paper tray.



(2) Insert the two fins on the paper tray into the slots on the back of the unit.

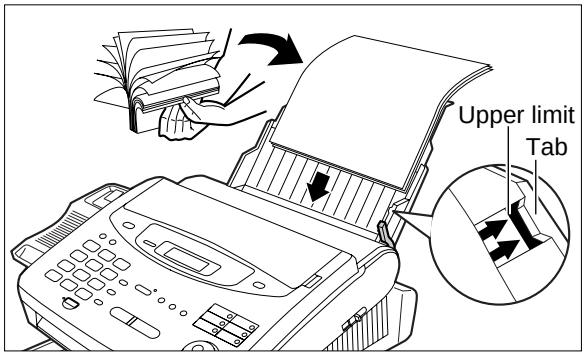


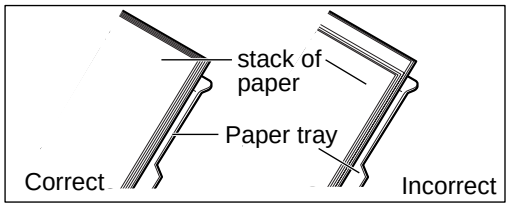
(3) Pull the recording paper set lever forwards.



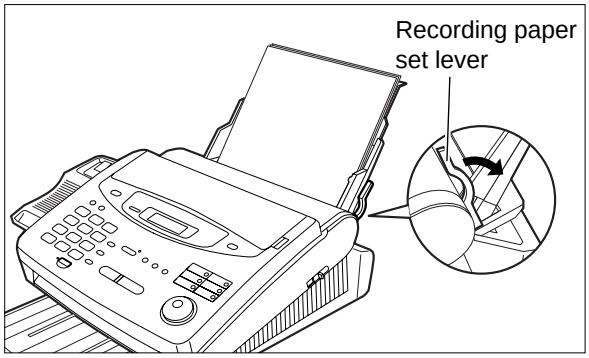
(4) Fan the stack of paper to avoid a paper jam and insert the paper into the paper tray.

- The height of the stack of the paper should not exceed the upper limit on the paper tray, or it may cause a paper jam.
- Then paper should not be over the tab.
- If the paper is not inserted correctly, readjust the paper or a paper jam may occur.





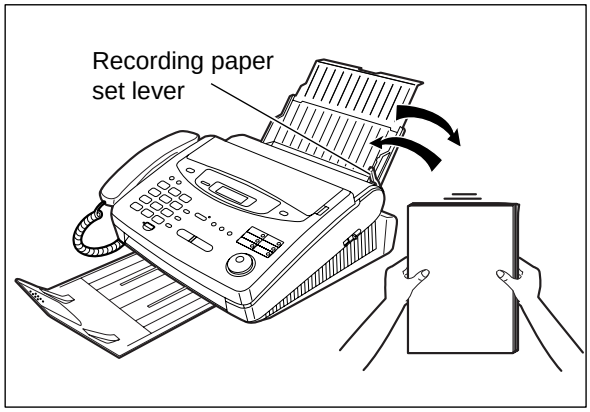
(5) Move the recording paper set lever back.



Note:

- Do not use different types or thicknesses of paper in the paper tray at the same time. This may cause a paper jam.
- Avoid extremely smooth or shiny paper that is highly textured. Also avoid paper that is coated, damaged or wrinkled paper with a cotton and/or fiber content that is over 20%.
- Avoid used paper for double-sided printing.
- Do not use paper printed from this unit for double-sided printing with other copiers or printers, or a paper jam may occur.
- The print quality may differ depending on the paper.

1.14.4. ADDING PAPER TO THE PAPER TRAY



1. Pull the recording paper set lever forwards.
   - The unit will beep and the following message is displayed.

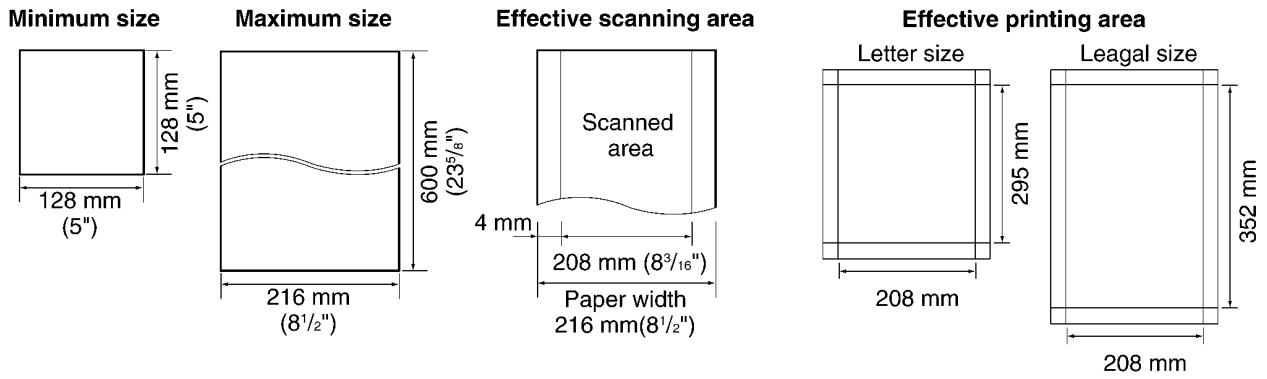
   Display: CHECK COVER
   (Prüfe Hebel)
2. Remove the installed paper.
3. Add paper to the removed paper.
4. Fan the stack of paper and insert it into the paper tray.
5. Move the recording paper set lever back.

Note:

- Words in brackets ( ) are German. A translated version for each market is available with this model series.

1.14.5. DOCUMENTS THE UNIT CAN FEED

- **Documents the unit can feed**



Note:

- Remove clips, staples or other similar fastening objects.
- Check that ink, paste or correction fluid has dried.
- Do not send the following types of documents. Use copied for fax transmission.

—Chemically treated paper such as carbon or carbonless duplication paper
—Electrostatically charged paper
—Heavily curled, creased or torn paper
—Paper with a coated surface
—Paper with a faint image
—Paper with printing on the opposite side that can be seen through the front (e.g. newspaper)

- Document is up to 15 Sheets.

Document weight

Single sheet:

45 to 90 g/m^2 (12 to 24 lb.)

Multiple sheets:

60 to 75 g/m^2 (16 to 20 lb.)

Recording paper weight

60 to 90 g/m^2 (16 to 24 lb.)

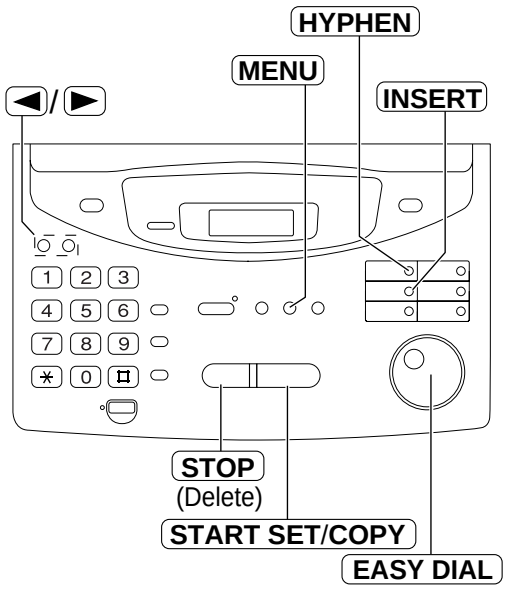
75 g/m^2 (20 lb.)... up to 150 sheet

Recording paper minimum size

Width : 210 mm

1.14.6. SETTING YOUR LOGO

The logo can be your company, division or name.



1 Press **MENU**.
(MEN†)

Display:
```
1.SYSTEM SET UP
```
(Verbereitung)

2 Press ⌗, then **0** **2**.

```
YOUR LOGO
```
(Eigenes Logo)

3 Press **START/SET/COPY**.
(START/⇨/KOPIE)

```
LOGO=
```

4 Enter your logo, up to 30 characters, by using the dial keypad or JOG DIAL.

Example: Bill

1. Press **2** twice.
```
LOGO=B
```
Cursor

2. Press **4** six times.
```
LOGO=Bi
```

3. Press **5** six times.
```
LOGO=Bil
```

4. Press ► to move the cursor to the next space and press **5** six times.
```
LOGO=Bill
```

5 Press **START/SET/COPY**.
(START/⇨/KOPIE)

```
SETUP ITEM [    ]
```
(Parameter [ ])

6 Press **MENU**.
(MEN†)

Note:

- You can enter your logo by rotating **JOG DIAL** (see the next page). If using **JOG DIAL**, press ► to move the cursor.

To correct a mistake

- Press ◄ or ► to move the cursor to the incorrect character, then make the correction.

To delete a character

- Move the cursor to the character you want to delete and press **STOP**.

To insert a character

1. Press ◄ or ► to move the cursor to the position to the right of where you want to insert the character.
2. Press **INSERT** (One-Touch Dial key 2) to insert a space and enter the character.

Note:

Words in brackets ( ) are German. A translated version for each market is available with this model series.

1.14.7. TO SELECT CHARACTERS WITH THE DIAL KEYPAD

Pressing the dial keys will select a character as shown below.

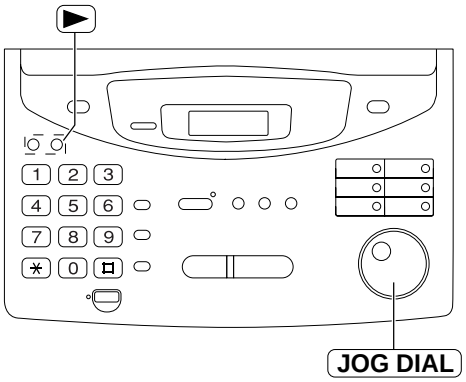
Tasten	Zeichen
1	1 [ ] { } + – / = , . _ ` : ; ? |
2	A Ä B C a ä b c 2
3	D E F d e f 3
4	G H I g h i 4
5	J K L j k l 5
6	M N O Ö m n o ö 6
7	P Q R S p q r s ß 7
8	T U Ü V t u ü v 8
9	W X Y Z w x y z 9
0	0 ( ) 〈 〉 ! " # $ % & ¥ ∗ @ ^ ' →
1	Taste **BINDESTRICH** (Zur Eingabe eines Bindestrichs.)
2	Taste **EINSCHALTEN** (Zum Einfügen eines Leerzeichens oder eines Zeichens.)
⊠	Taste **LÖSCHEN** (Dient zum Löschen eines Zeichens.)
◀▼	Taste (fi) (Verschiebt den Cursor nach links.)
▲▶	Taste (fl) (Verschiebt den Cursor nach rechts.) Wenn Sie ein weiteres Zeichen unter Verwendung derselben Zifferntaste eingeben wollen, müssen Sie den Cursor erst auf die nächste Stelle verschieben.

Note: A hyphen entered in a telephone number is counted as two digits.

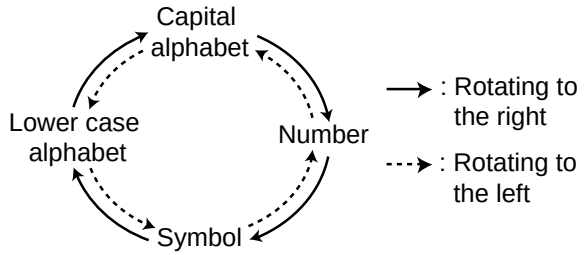
1.14.8. TO SELECT CHARACTERS USING THE JOG DIAL

Instead of pressing the dial keys, you can select characters using the JOG DIAL.

1. Rotate **JOG DIAL** until the desired character is displayed.
2. Press ► to move the cursor to the next space.
   - The character displayed in step 1 is inserted.
3. Return to step 1 to enter the next character.



Display order of characters

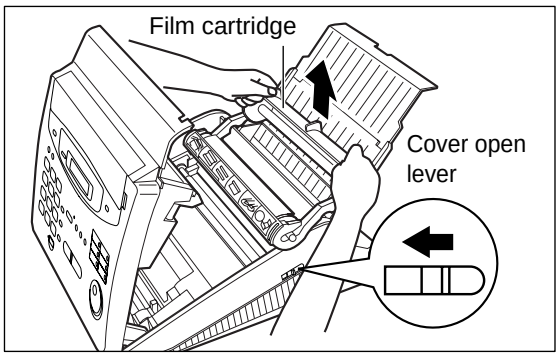


1.14.9. REPLACING THE FILM CARTRIDGE

When the unit detects the end of the film, the following message will be displayed.

FILM NEAR EMPTY (NŠhe Filmende)	The remaining film produces approx. 10 A4 size documents. Prepare a new film or film cartridge.
FILM EMPTY (Film erschšpft)	The film is empty. Replace the film or film cartridge with a new one.

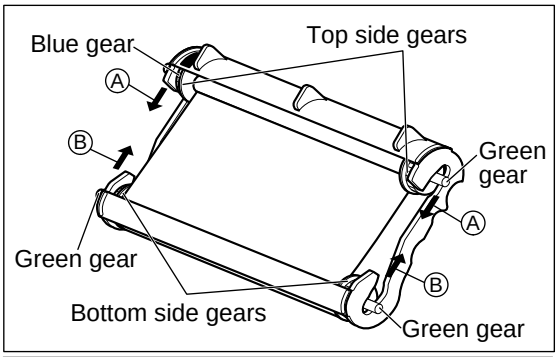
For film and film cartridge information, refer to page 9.



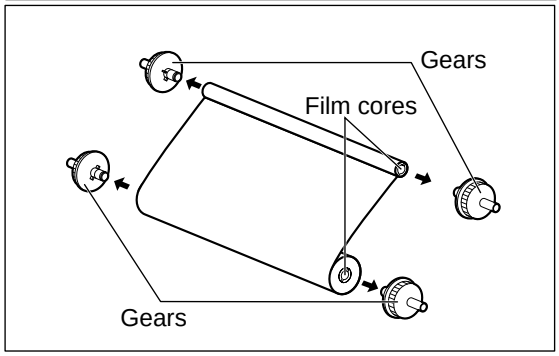
(1) Slide the front cover open lever forwards to open the front cover.

(2) Remove the film cartridge.

- If you have purchased a film cartridge (Parts no. KX-FA135X) for replacement, skip to step 9.
- To replace only the film(Parts no. KX-FA136X), go to step 3.



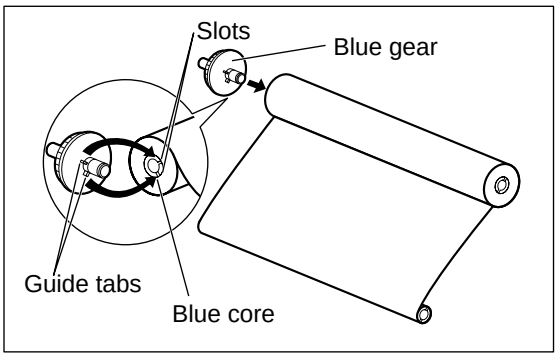
(3) Unlock the four gears by (Ⓐ) pulling the top side gears (blue and green gears) forwards and (Ⓑ) pushing back the bottom side gears (green gears) and remove the used film.



(4) Remove the four gears from the used film cores.

Caution:

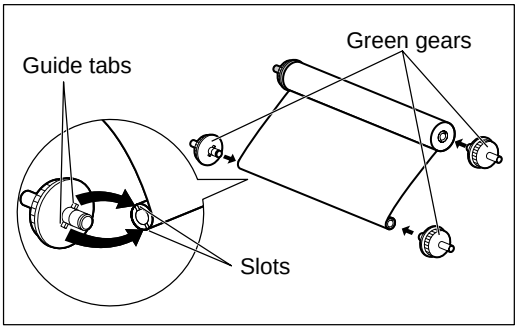
- The film is not reusable. You can order a new film for replacement through your nearest Panasonic dealer. (Refer to page 9)



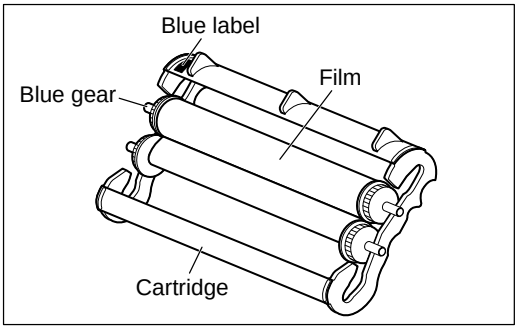
(5) Insert the blue gear into the blue core of the new film.

Note:

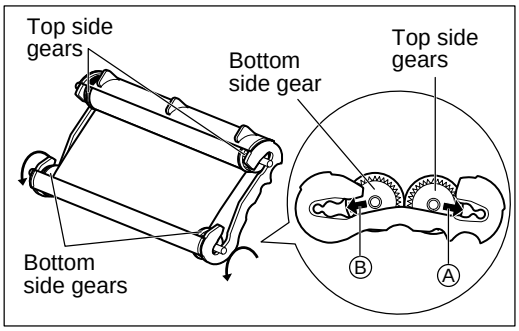
- Words in brackets ( ) are German. A translated version for each market is available with model series.



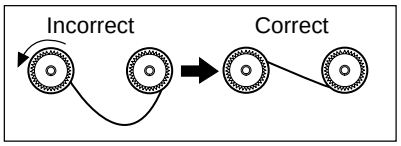
(6) Insert the three green gears into the remaining cores of the new film.

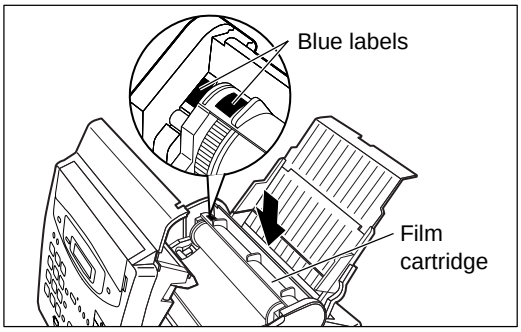


(7) Insert the film into the cartridge so that the blue gear matches the blue label on the cartridge.



(8) Lock the four gears of the film by (Ⓐ) pushing back the top side gears and (Ⓑ) pulling the bottom side gears forwards until they click into place.
- If the film is slack, tighten it by winding the bottom side gears.





(9) Insert the film cartridge by matching the blue label on the cartridge with that on the unit.

(10) Close the front cover securely by pushing down on both ends.
- The unit will check the film is set correctly and the following message will be displayed.

Display: `PLEASE WAIT`
(Bitte warte)

- If the following message is displayed, the film is not correctly inserted in the cartridge.

`CHECK FILM`
(Film prüfen)

Reinsert it correctly.

•How much film you have left

To check the amount of remaining film, press **FILM REMAINING** (FILMANZEIGE) while the unit is idle. The display indicates the approximate amount of remaining film.

Display: `FILM E▬▬▬▬F`
(Film – +)

↓

`FILM E▬ F`
(Film – +)

When the film indicator points to this position, the remaining film will print up to 25 pages of letter size documents. Prepare a new film or film cartridge for replacement.

Note:

Words in brackets ( ) are German. A translated version for each market is available with this model series.

1.15. MAINTENANCE ITEMS AND COMPONENT LOCATIONS

1.15.1. OUTLINE

MAINTENANCE AND REPAIRS ARE PERFORMED USING THE FOLLOWING STEPS.

1. **Periodic maintenance**

   Inspect the equipment periodically and if necessary, clean any contaminated parts.

2. **Check for breakdowns**

   Look for problems and consider how they arose.

   If the equipment can be still used, perform copying, self testing or communication testing.

3. **Check equipment**

   Perform copying, self testing and communication testing to determine if the problem originates from the transmitter, the receiver or the telephone line.

4. **Determine causes**

   Determine the causes of the equipment problem by troubleshooting.

5. **Equipment repairs**

   Repair or replace the defective parts and take appropriate measures at this stage to ensure that the problem does not recur.

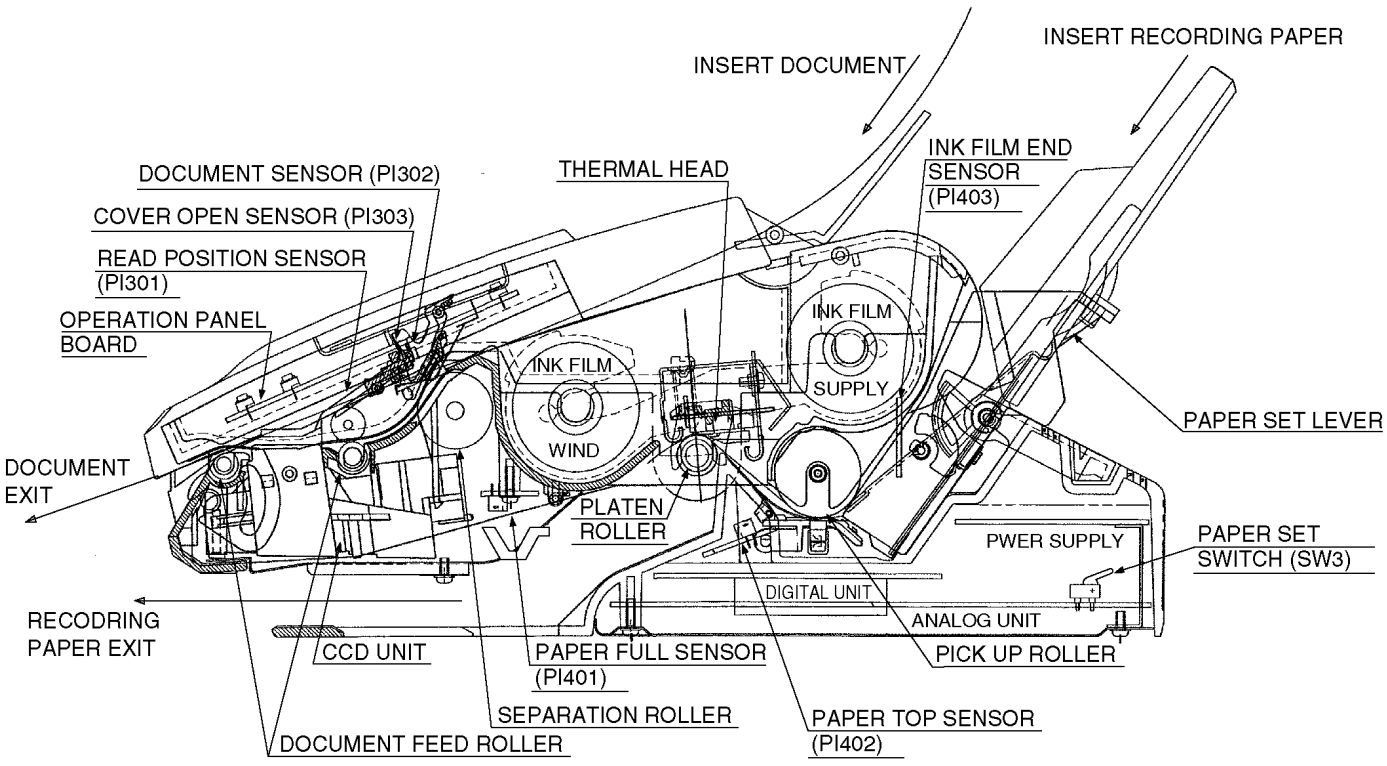
6. **Confirm normal operation of the equipment**

   After completing the repairs, conduct copying, self testing and communication testing to confirm that the equipment operates normally.

7. **Record keeping**

   Make a record of the measures taken to rectify the problem for future reference.

1.15.2. MAINTENANCE CHECK ITEMS/COMPONENT LOCATIONS



1.15.2.1. MAINTENANCE LIST

NO.	OPERATION	CHECK	REMARKS
1	Document Path	Remove any foreign matter such as paper.	—
2	Rollers	If the roller is dirty, clean it with a damp cloth then dry thoroughly.	See **1.15.3. MAINTENANCE**.
3	Platen Roller	If the platen is dirty, clean it with a damp cloth then dry thoroughly.Remove the paper and film cartridge before cleaning.	—
4	Thermal Head	If the thermal head is dirty, clean the printing surface with a cloth moistened with denatured alcohol (alcohol without water), then dry thoroughly.	See **1.15.3. MAINTENANCE** and **4. DISASSEMBLY INSTRUCTIONS**.
5	Target Glass, White Plate	If the Target glass and white plate are dirty, clean the glass with a soft dry cloth.	See **1.15.3. MAINTENANCE**.
6	Sensors	Document sensor (PI302), Read position sensor (PI301), Hook switch (SW401), Paper top sensor (PI402), Paper full sensor (PI401), Film end sensor (PI403), Cover open sensor (PI303) and Paper set switch (SW3). Confirm operation of sensors.	See **1.15.2. MAINTENANCE CHECK ITEMS/COMPONENT LOCATIONS** or **2.3.3.9. Sensor Board Section** and **6.5. SENSORS AND SWITCHES**.
7	Mirrors and Lens	If the mirror and lens are dirty, clean them with a soft dry cloth.	—
8	Abnormal, wear and tear or looseness parts	Exchange the part.Check the tightness of screws on all parts.	—

1.15.2.2. MAINTENANCE CYCLE

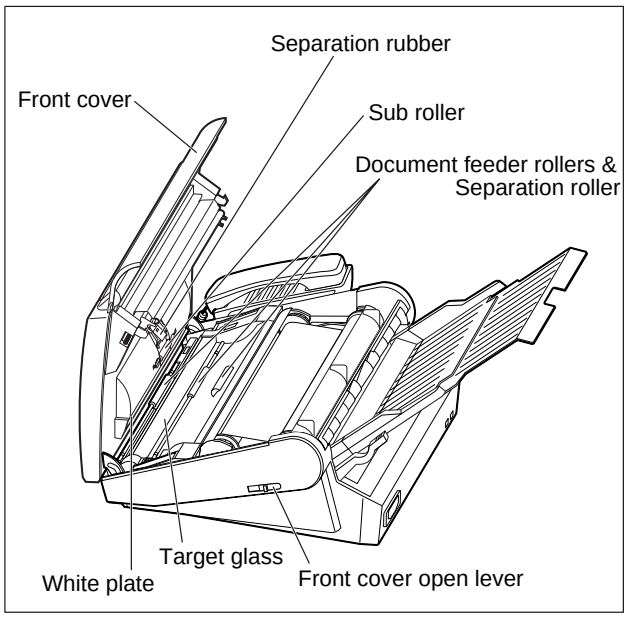
No.	Item	Cleaning		Replacement	
		Cycle	Procedure	Cycle	Procedure
1	Separation Roller (Ref. No. 165)	3 months	See **1.15.3. MAINTENANCE**.	7 years* (100,000 documents)	See **4. DISASSEMBLY INSTRUCTIONS**.
2	Separation Rubber (Ref. No. 57)	3 months	See **1.15.3. MAINTENANCE**.	7 years (100,000 documents)	See **4. DISASSEMBLY INSTRUCTIONS**.
3	Feed Rollers (Ref. No. 135, 139)	3 months	See **1.15.3. MAINTENANCE**.	7 years (100,000 documents)	See **4. DISASSEMBLY INSTRUCTIONS**.
4	Target Glass, White Plate (Ref. No. 201, 54)	3 months	See **1.15.3. MAINTENANCE**.	7 years (100,000 documents)	See **4. DISASSEMBLY INSTRUCTIONS**.
5	Thermal Head (Ref. No. 67)	3 months	See **1.15.3. MAINTENANCE**.	7 years (100,000 documents)	See **4. DISASSEMBLY INSTRUCTIONS**.
6	Platen Roller (Ref. No. 133)	3 months	See **4. DISASSEMBLY INSTRUCTIONS**.	7 years (100,000 documents)	See **4. DISASSEMBLY INSTRUCTIONS**.
7	Pickup Roller (Ref. No. 142)	3 months	See **4. DISASSEMBLY INSTRUCTIONS**.	7 years (100,000 documents)	See **4. DISASSEMBLY INSTRUCTIONS**.

* These values are standard and may vary depending on usage conditions.

1.15.3. MAINTENANCE

1.15.3.1. CLEANING THE DOCUMENT FEEDER UNIT

If misfeeding occurs frequently or when dirty patterns or black bands appear on a copied or transmitted document, clean the document feed rollers, sub roller, separation rubber flap, white plate and target glass.



(1) Disconnect the power cord and the telephone line cord.

(2) Slide the lever forwards to open the front cover.

(3) Clean the document feed rollers, sub roller and separation rubber and separation roller with a cloth moistened with isopropyl rubbing alcohol, and let dry thooughly.

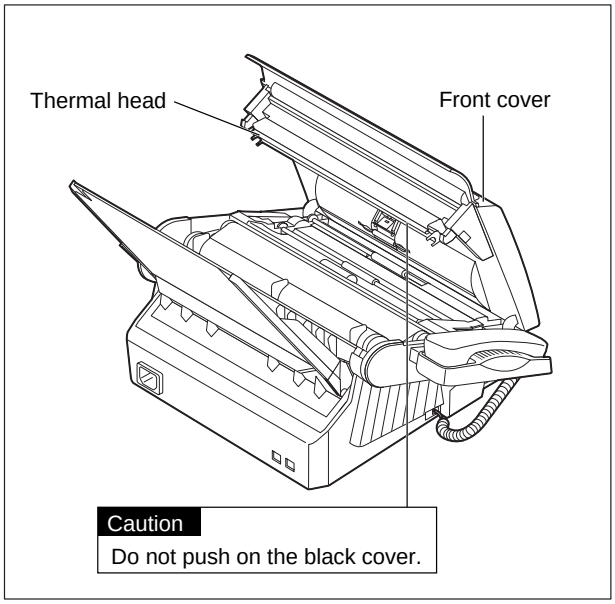
(4) Clean the white plate and the target glass with a soft dry cloth.

(5) Close the front cover by gently pressing down on both ends.

(6) Connect the power cord and telephone line cord.

1.15.3.2. CLEANING THE THERMAL HEAD

If dirty patterns or black bands appear on a copied or received document, clean the thermal head.



(1) Disconnect the power cord and the telephone line cord.

(2) Slide the open lever forwards to open the front cover.

(3) Clean the thermal head with a cloth moistened with isopropyl rubbing alcohol, then dry thoroughly.

(4) Close the front cover by gently pressing down on both ends.

(5) Connect the power cord and telephone line cord.

1.15.3.3. CLEANING THE PICKUP ROLLER.....Refer to 4. DISASSEMBLY INSTRUCTIONS

Caution:

To prevent malfunction due to static electricity, do not use a dry cloth and do not touch the thermal head directly with your finger.

2 TROUBLESHOOTING GUIDE

2.1. TROUBLESHOOTING SUMMARY

2.1.1. TROUBLESHOOTING

After confirming the problem by asking the user, troubleshoot according to the instructions and observe the following precautions.

2.1.2. PRECAUTIONS

1. If there is a problem with the print quality or the paper feed, first check if the installation space and the print paper meets the specifications, the paper selection lever/paper thickness lever is set correctly, and the paper is set correctly without any slack.
2. Before troubleshooting, first check that the connectors and cables are connected correctly (not loose). If the problem occurs randomly, check it very carefully.
3. When connecting the AC power cord with the unit and checking the operation, exercise utmost care when handling electric parts in order to avoid electric shocks and short-circuits.
4. After troubleshooting, double check that you have not forgotten any connectors, left any loose screws, etc.
5. Always test to verify that the unit is working normally.

2.1.3. WHEN YOU DON´T KNOW HOW TO OPERATE THE UNIT, USE THE HELP FUNCTION

• How to use:

1. Select which operation you want to print out by pressing **HELP** (HILFE) repeatedly.
2. Press ▲ or ▼ until the desired item is displayed. The following item are available.
3. Press **START/SET/COPY** (START/⇨/KOPIE).

Note:

Words in brackets ( ) are German. A translated version for each market is available with this model series.

2.2. USER RECOVERABLE ERRORS

If the unit detects a problem, one or more of the following messages will appear on the display.

DISPLAY MESSAGE	CAUSE AND REMEDY
CALL SERVICE (Service Notwend)	• There is something wrong with the unit. Contact our service personnel. [This error is displayed when the thermal head does not warm up. Check the thermistor on the thermal head and connector lead. (for technicians)]
CHECK COVER (Deckel prüfen)	• The cover is open. Close it.
CHECK DOCUMENT (Vorlage prüfen)	• The document is not fed into the unit properly. Reinsert the document. If misfeeding occurs frequently, clean the document feeder rollers and try again. If the problem remains, adjust the feeder pressure.
CHECK FILM (Film prüfen)	• The film cartridge is not installed properly. Reinsert it correctly.
CHECK LEVER (Prüfen Hebel)	• The recording paper set lever is released. Push it back to set the lever.
CHECK MEMORY (Speicher prüfen)	• Memory (telephone numbers, parameters, etc.) has been erased. Re-program. [The backup battery on the top of the digital board may be low or dead, so check it.]
CHECK PAPER (Prüfe Papier)	• The recording paper is not installed or the unit has run out of paper. Install paper and press **START/SET/COPY** to clear the message. • The recording paper is not fed into the unit properly or has jammed near the recording paper entrance. Clear the jammed paper and press **START/SET/COPY** to clear the message. Do not install folded or heavily curled paper in the paper tray.
DIRECTORY FULL (Jog-Dial voll)	• There is no space to store new stations in the EASY DIAL directory. Edit or erase unnecessary stations.
FAX IN MEMORY (Fax im Speicher)	• The unit has a document in memory. See the other displayed message instructions to print out the document.
FAX MEMORY FULL (Speicher voll)	• Memory is full of received documents due to lack of recording paper or a recording paper jam, etc. Install paper or clear the jammed paper. • When performing memory transmission, the document being stored exceeds the memory capacity of the unit. Transmit the entire document using manual or automatic transmission.
FILM EMPTY (Film erschöpft)	• The film is empty. Replace the film cartridge. ¥The film is slack. Tighten it and install again.
FILM NEAR EMPTY (Nähe Filmende)	• The remaining film can print about 10 pages of A4 size documents. Prepare a new film or film cartridge.
FREE FILM EMPTY (Film leer)	• The free starter film is empty. Replace the film or film cartridge.
MODEM ERROR (Modemfehler)	• There is something wrong with the modem circuit. Contact our service parsonal.

Note:

- The explanations given in the [ ] are for servicemen only.
- Words in brackets ( ) are German. A translated version for each market is available with this model series.

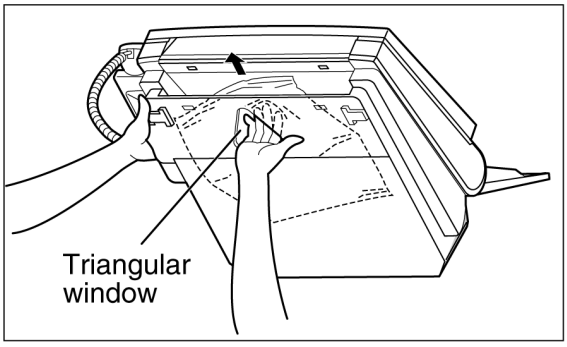
DISPLAY MESSAGE	CAUSE AND REMEDY
NO FAX REPLY (Keine Faxantw.)	• The other party's fax machine is busy or has run out of recording paper. Try again.
PAPER JAMMED (Papierstau)	• A recording paper jam occurred under the film cartridge. Clear the jammed paper. [If the printout jams, please refer to Fig. a on the next page.]
PLEASE WAIT (Bitte warten)	• The unit is chacking that there is no slake on the film. Wait a while.
POLLING ERROR (Abruf Fehler)	• The other party's fax machine dose not provide the polling function. Chack with the other party.
REDIAL TIME OUT (WW Zeitablauf)	• The other party's fax machine is busy or has run out of recording paper. Try again.
REMOVE DOCUMENT (Stau beseitigen)	• The document is jammed. Remove the jammed document. • Attempted to transmit a document longer than 600 mm. Press **STOP** to remove the document. Divide the document into two or more sheets and try again. [Alternatery, turn off service code #559 to enable sending of documents longer than 600 mm.]
TRANSMIT ERROR (Empf. Fehler)	• A transmission error occurred. Try again.
UNIT OVERHEATED (Thermokopf heiß)	• The unit is too hot. Let the unit cool down. [If many copies are nearly all black, this message will be displayed. When this occurs, open the front cover and let the unit cool down.]
MWSSAGE FULL (Sprachsp. voll)	• There is no room left in memory to record a voice message. Erase some or all of the message.
NO TAD GREETING (Keine Ansage)	• Your TAD/FAX greeting message is not recorded. Record a greeting message. • The voice guidance feature is set to "OFF". Modify the setting. Pre-recorded greeting message will be adopted.
KX-FM330 only PC FAIL OR BUSY (PC Verbind • Fehl)	• The fax function cannot be operated by the PC. The RS232C cable is not connected correctly, or the software is not running on the PC. [If many copies are nearly all black, this message will be displayed. When this occurs, open the front cover and let the unit cool down.]

Note:

- The explanations given in the [ ] are for servicemen.
- Words in brackets ( ) are german. A translated version for each market is available with this model series.

2.2.1. PAPER JAM

① Lift the unit slightly and push out the jammed recording paper from the trianglar window on the bottom of the unit.



② Remove the jammed recording paper from the recording paper exit.

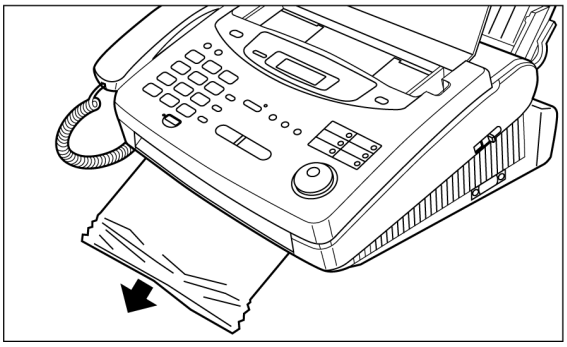


Fig. a

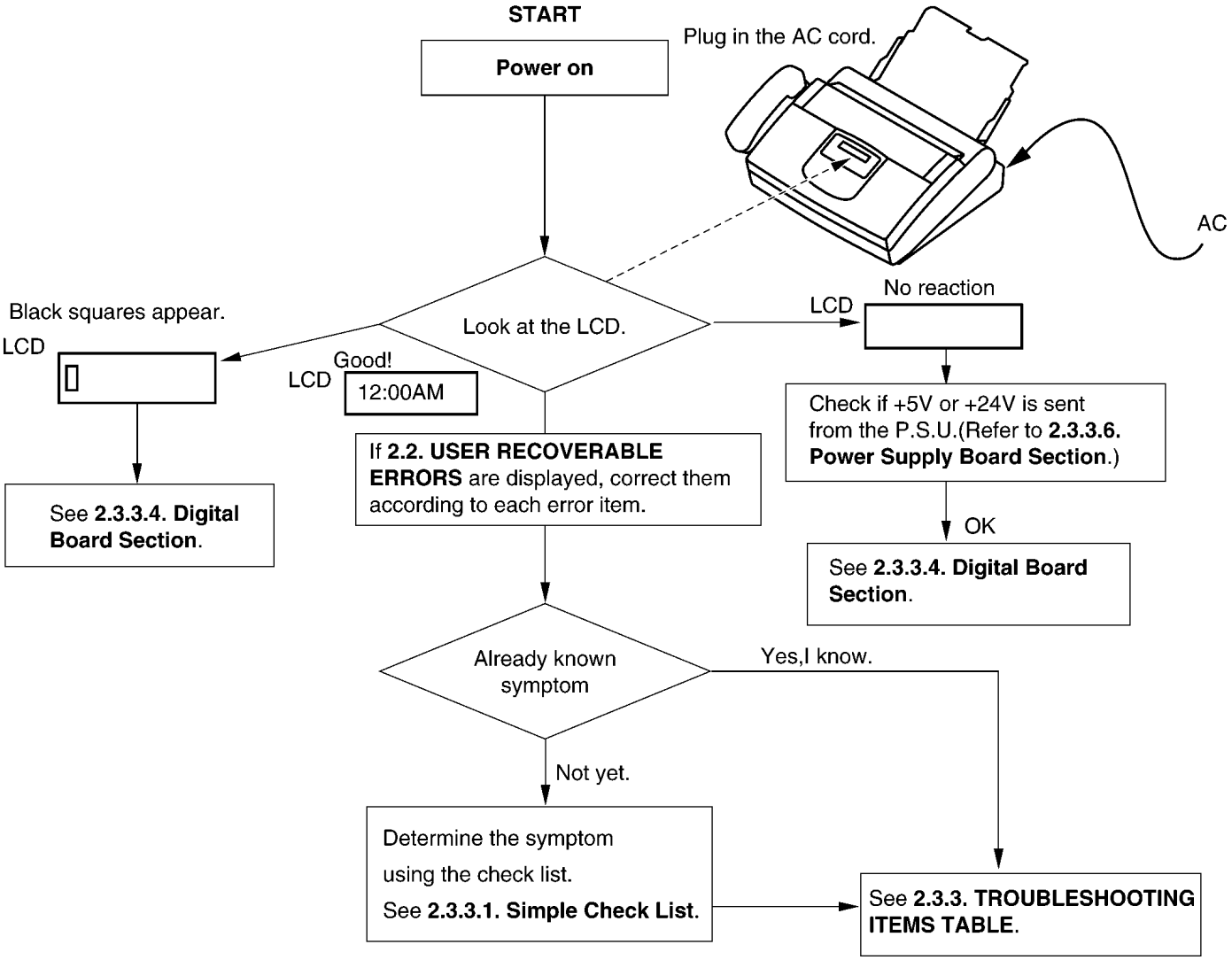
2.3. TROUBLESHOOTING DETAILS

2.3.1. OUTLINE

Troubleshooting is for recovering quality and reliability by determining the broken component and replacing, adjusting or cleaning it as required. First, determine the problem then decide the troubleshooting method. If you have difficulty finding the broken part, determine which board is broken. (For example: the Digital PCB, Analog PCB, etc.) The claim tag from a customer or dealer may use different expressions for the same problem, as they are not a technician or engineer. Using your experience, test the problem area corresponding to the claim. Also, returns from a customer or dealer often have a claim tag. For these cases as well, you need to determine the problem. Test the unit using **2.3.3.1. Simple Check List**. Difficult problems may be hard to determine, so repeated testing is necessary.

2.3.2. STARTING TROUBLESHOOTING

Determine the symptom and the troubleshooting method.



2.3.3. TROUBLESHOOTING ITEMS TABLE

ITEM	SYMPTOM	SEE THIS PAGE.
Printing	The sent fax data is skewed. The received fax data is skewed. The received or copied data is expanded. A blank page is copied. A blank page is received. An abnormal image is printed. Black or white vertical line Black or white lateral line	See **2.3.3.2. ADF (Auto document feed) Section**.
ADF (Auto Document Feeder)	The document does not feed. Document jam Multiple feed Skew	See **2.3.3.2. ADF (Auto document feed) Section.**
Recording paper feed	The recording paper does not feed. Paper jam Multiple feed	See **2.3.3.2. ADF (Auto document feed) Section**.
Operation panel	Keys are not accepted.	See **2.3.3.7. Operation Panel Section**.
Sensor	If the electric circuit is the cause, "REMOVE DOCUMENT" will be displayed.	See **2.3.3.8. sensor Board Section**.
Communication FAX, TEL (analog board)	Cannot communicate by fax. An error code is displayed.	See **2.3.3.3. Communication Section**.
	Cannot talk. The DTMF tone doesn't work. The handset/SP-phone doesn't work, etc.	See **2.3.3.5. Analog Board Section**.

2.3.3.1. Simple Check List

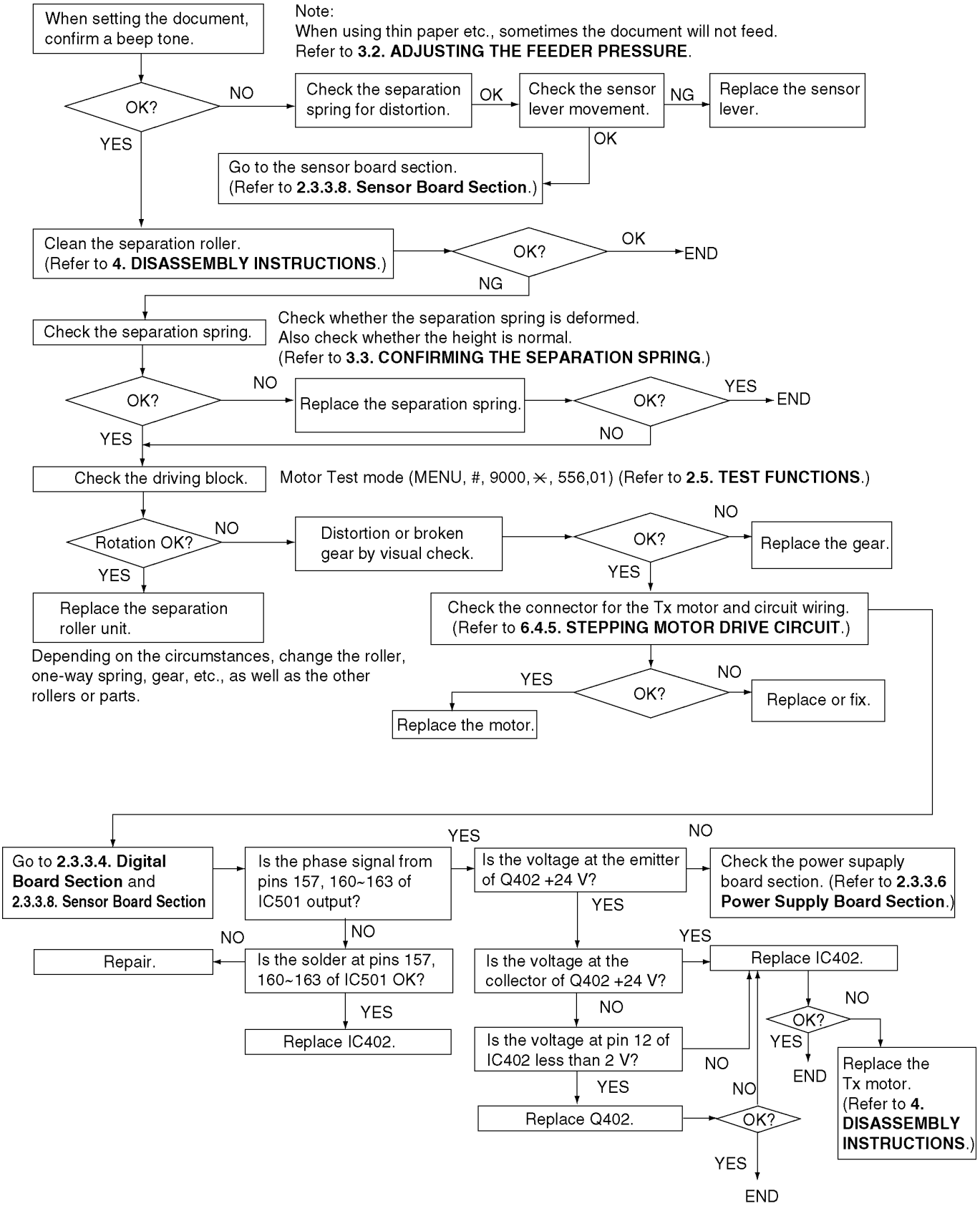
SERIAL NO. _____ DATE _____

FUNCTION		JUDGEMENT	REFERENCE
FAX operaton	Transmission	OK / NG	
	Receiving	OK / NG	
Copy operation		OK / NG	
Telephone operation	Handset transceiver/ receiver	OK / NG	
	SP-PHONE sound	OK / NG	
	Ringer sound	OK / NG	
	Dial operation	OK / NG	
	Volume operation	OK / NG	
	VOX detection	OK / NG	Service code 815※
Operation panel	Key check	OK / NG	Service code 561※
	LED check	OK / NG	Service code 557※
	LCD check	OK / NG	Service code 558※
Sensor	Sensor check	OK / NG	Service code 815※
Clock		OK / NG	Is the time kept correctly? Check with another clock.
Digital Speaker phone		OK / NG	
Digital TAM	Greeting Rec/Play	OK / NG	
	Incoming message Rec/Play	OK / NG	
	Memo Rec/Play	OK / NG	
Voice prompt		OK / NG	Service code 784 Check whether voice prompt is play or not.

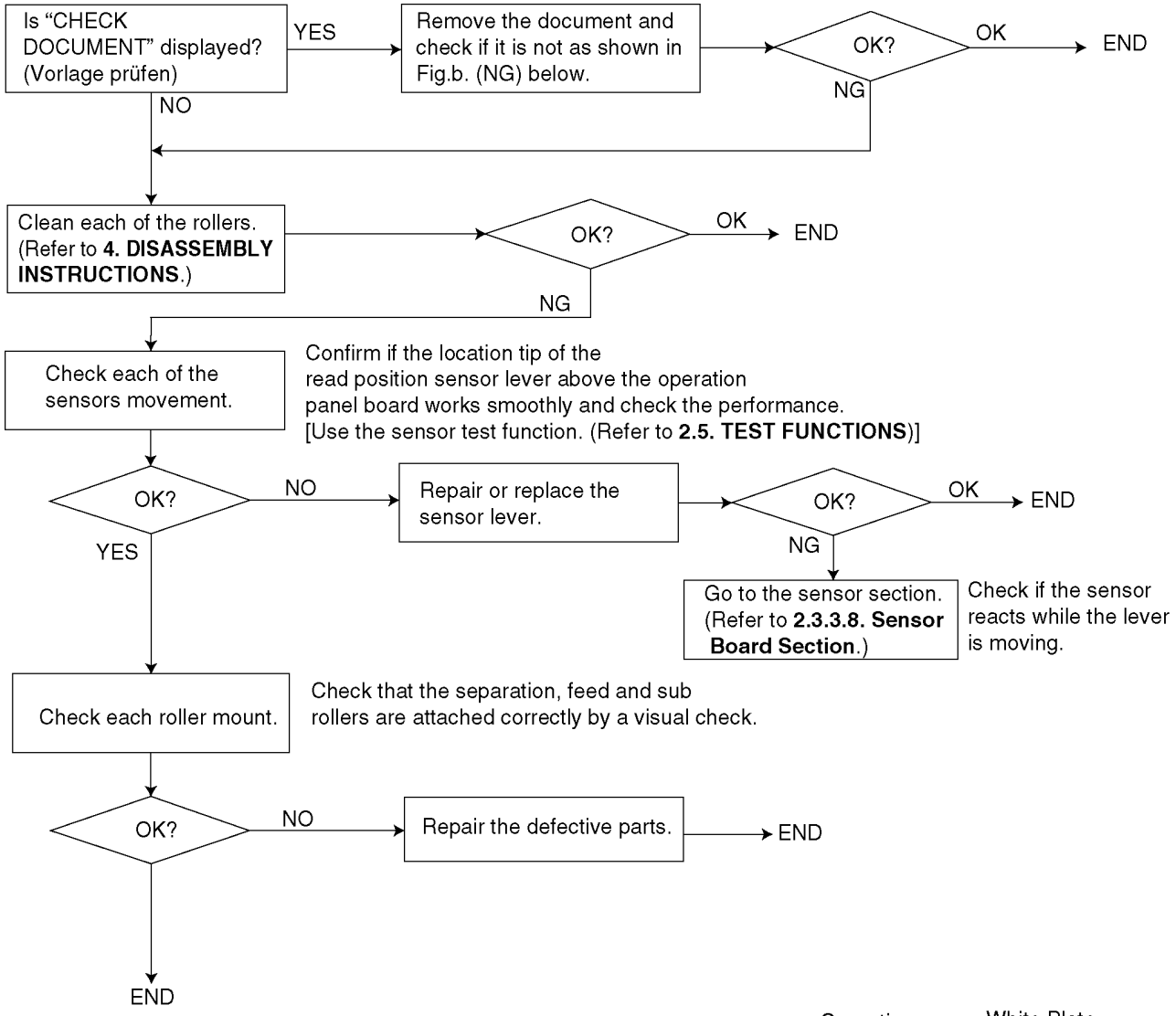
※Check according to the service code referring to **2.5 TEST FUNCTIONS**.

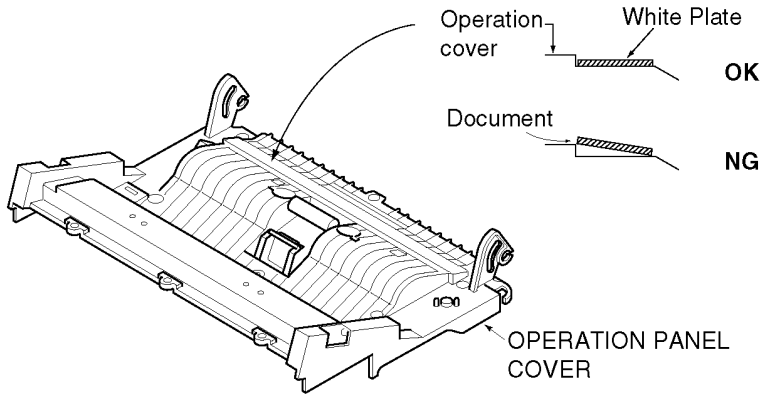
2.3.3.2. ADF (Auto document feed) section

1. **No document feed**



2. **Document JAM**

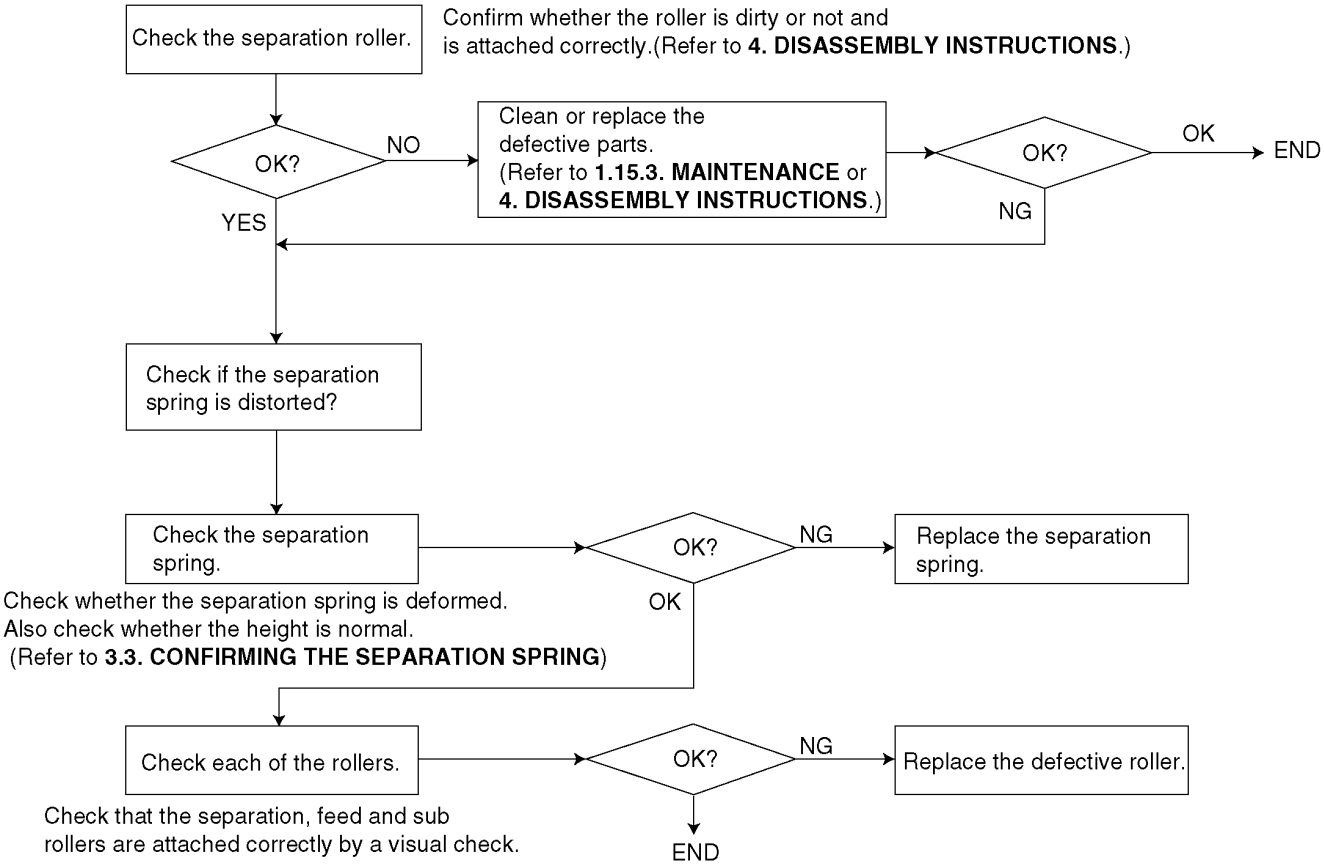




3. **Multiple feed**

・When using thick paper etc., sometimes the document will not be fed.

Refer to **3.2. ADJUSTING FEEDER PRESSURE**.



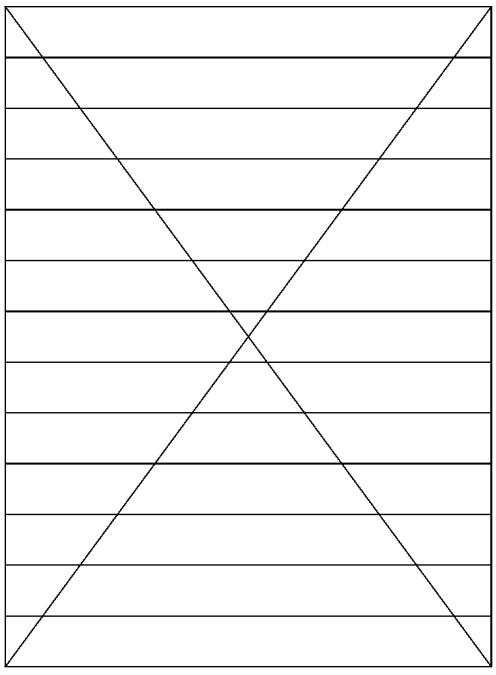
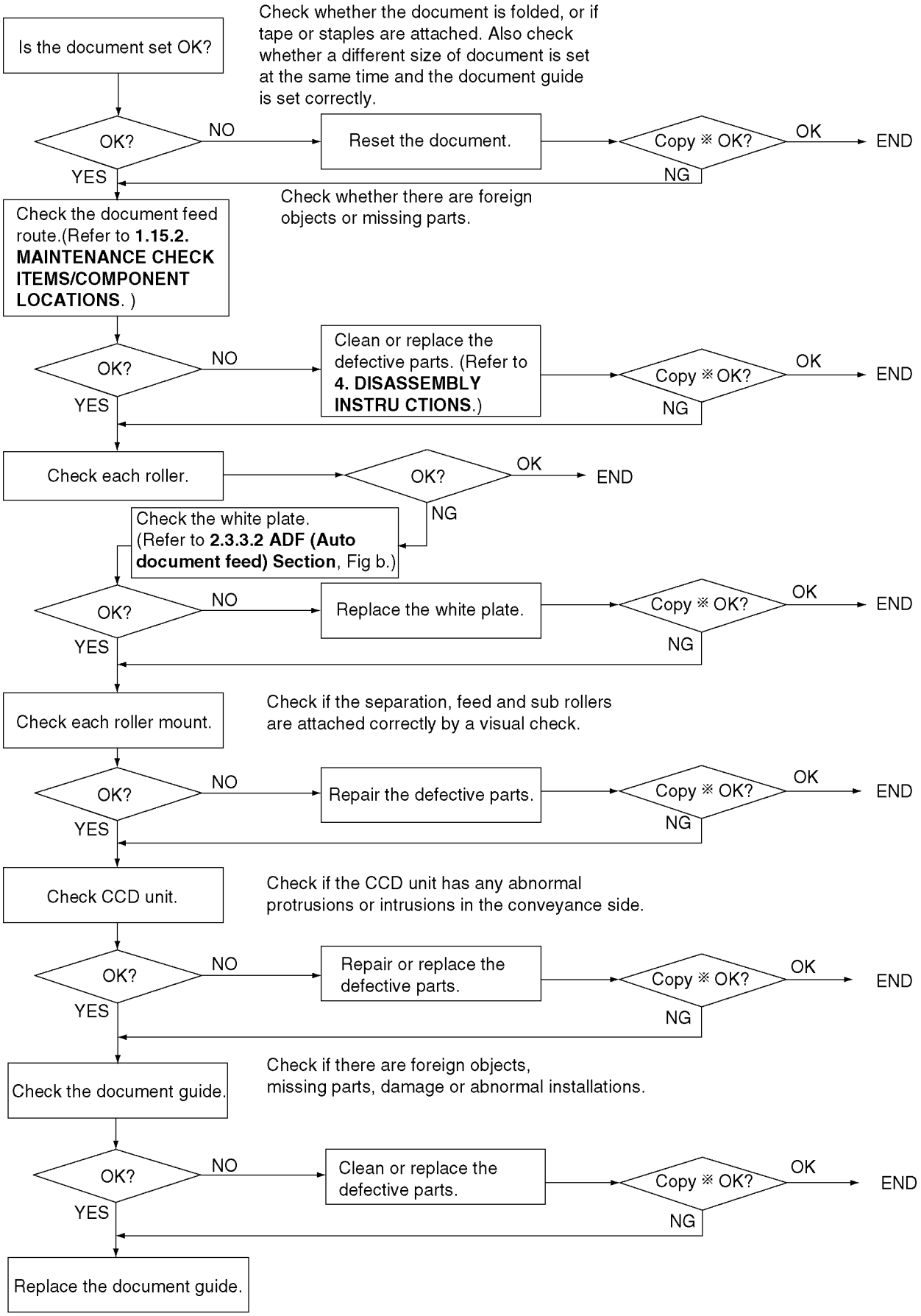


Fig. A

Note:

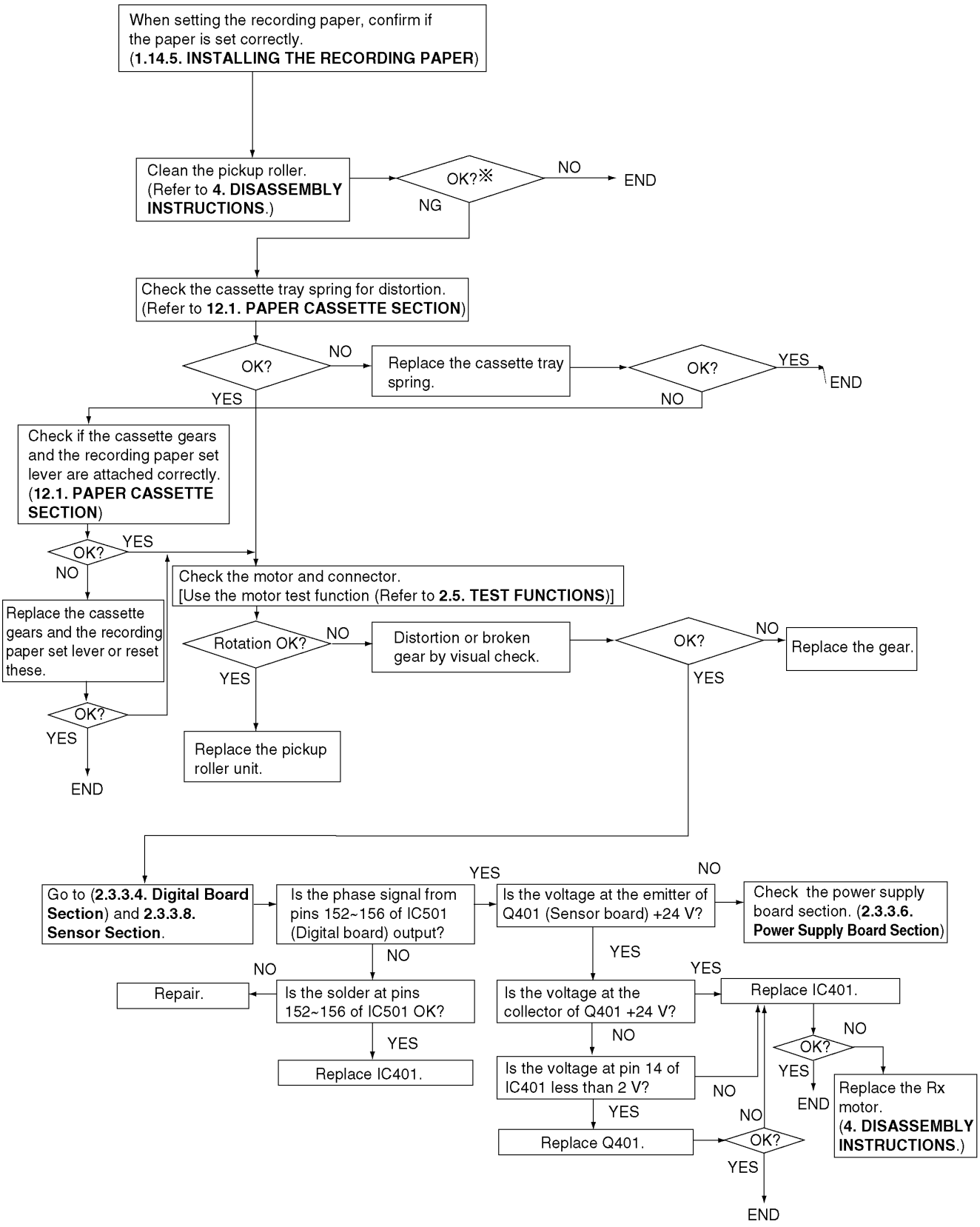
When confirming if the characters are expanded or distorted on, if the feed problem ocurred, use this kind of test chart.

4. **Skew**



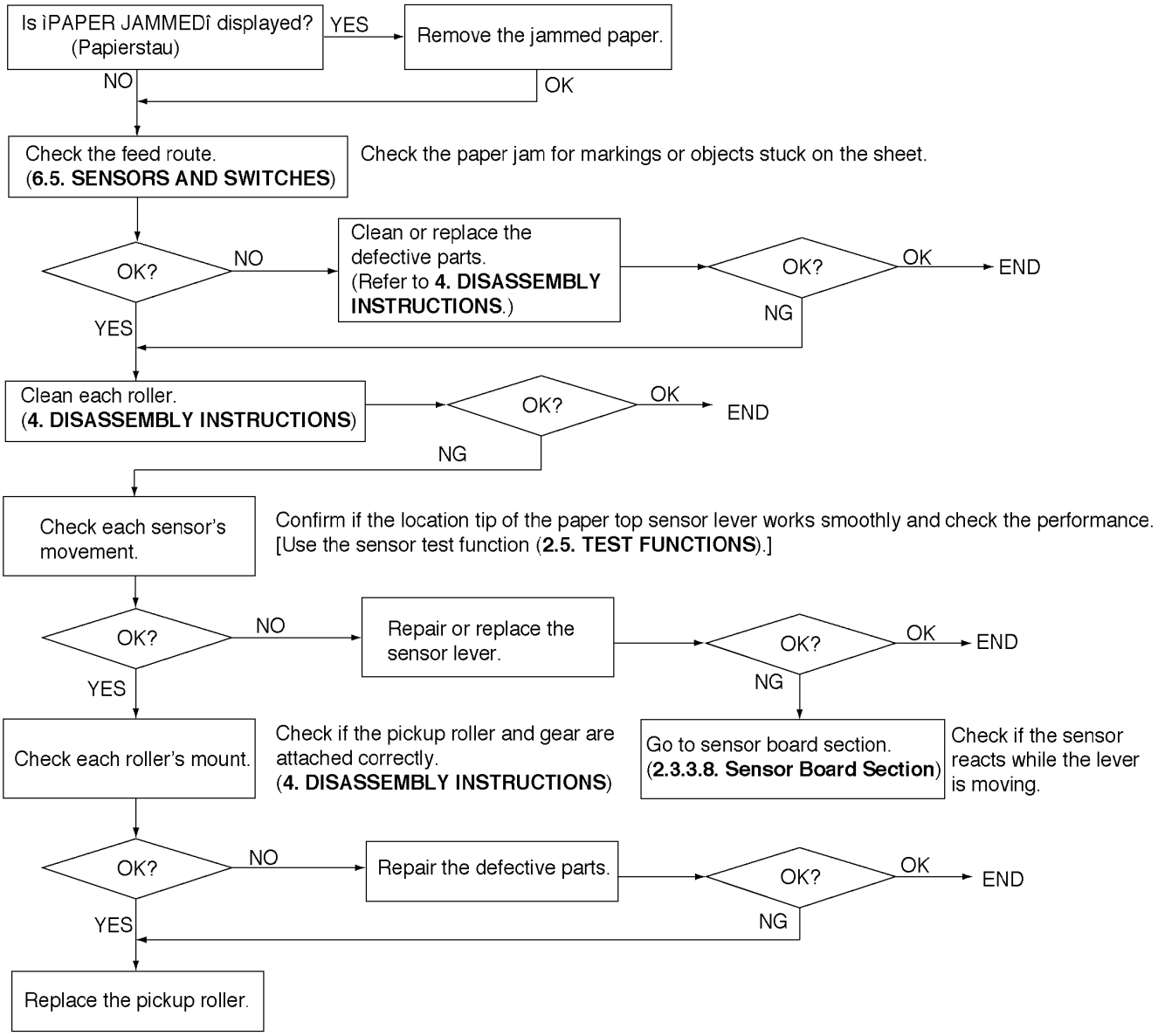
***We recommend making a copy of the Fig. A document in 3. Multiple feed and using it.**

5. **The recording paper does not feed.**

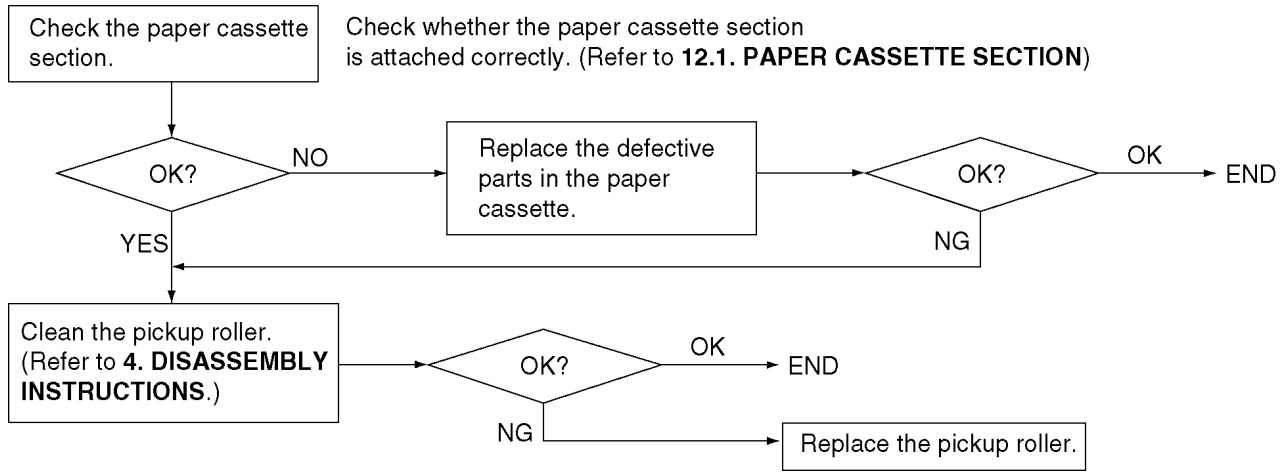


***We recommend making a copy of the Fig. A document in 3. Multiple feed and using it.**

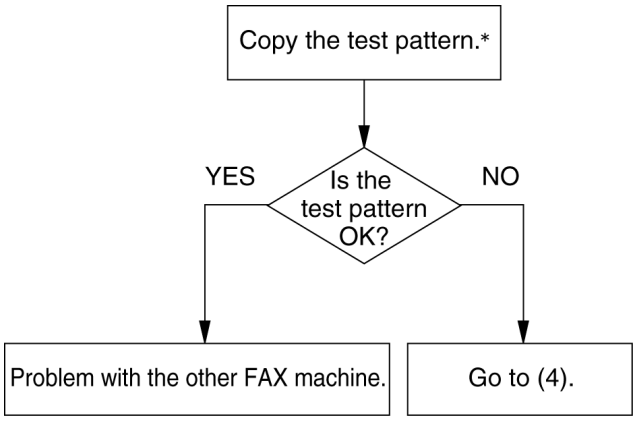
6. **Paper JAM**



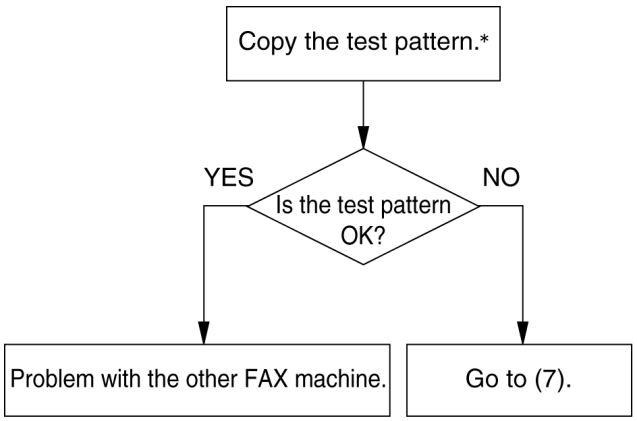
7. **Multiple feed and skew**



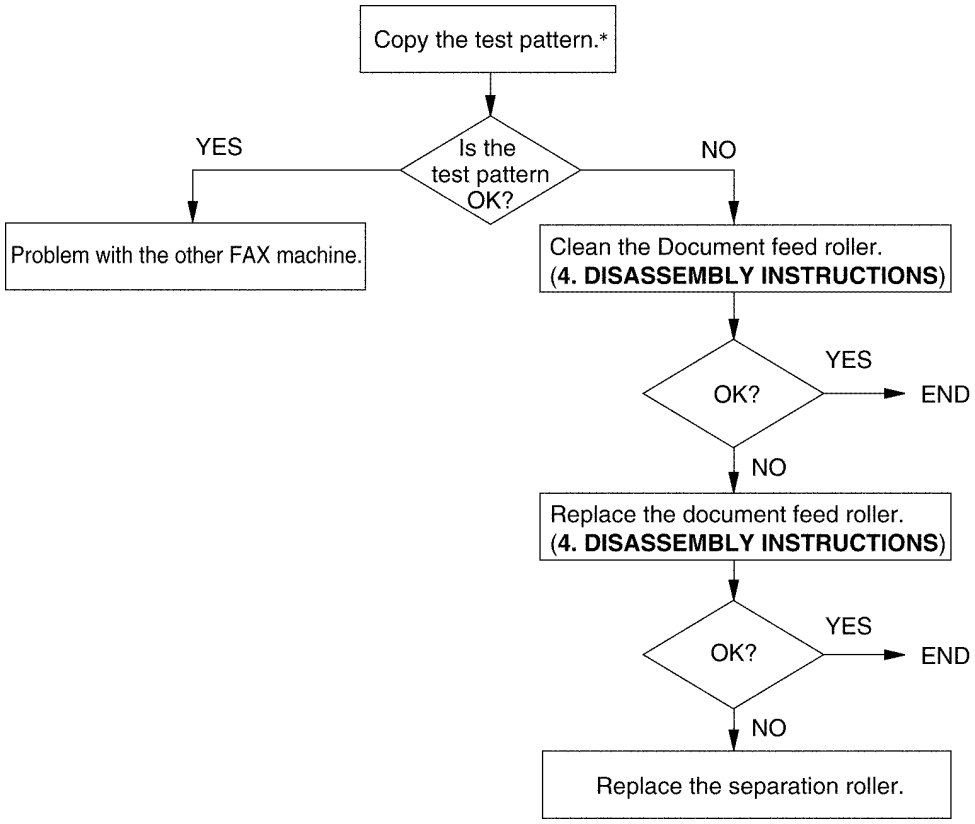
8. **The sent fax data is skewed.**



9. **The received fax data is skewed.**

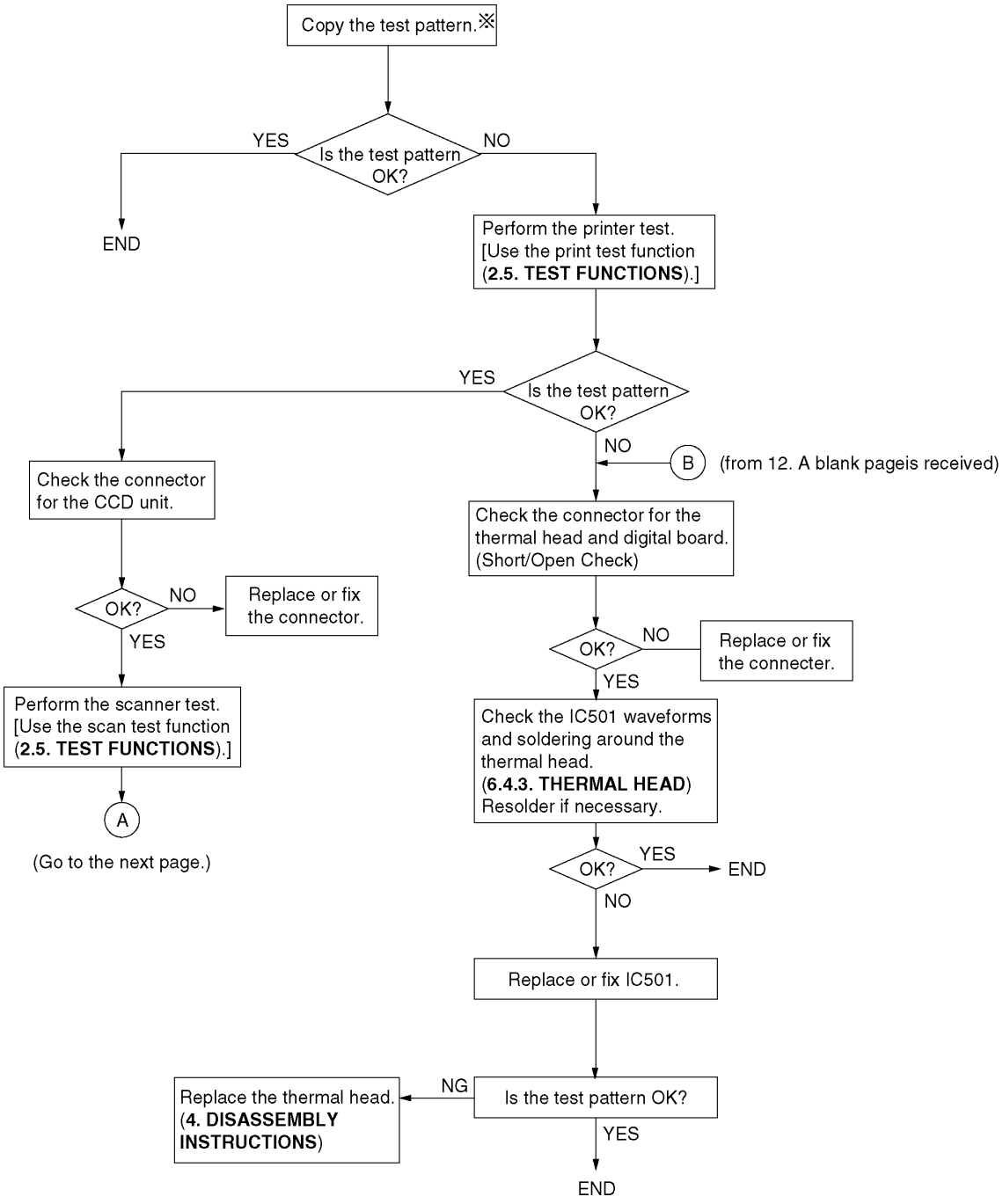


10. **Received or copied data is expanded.**

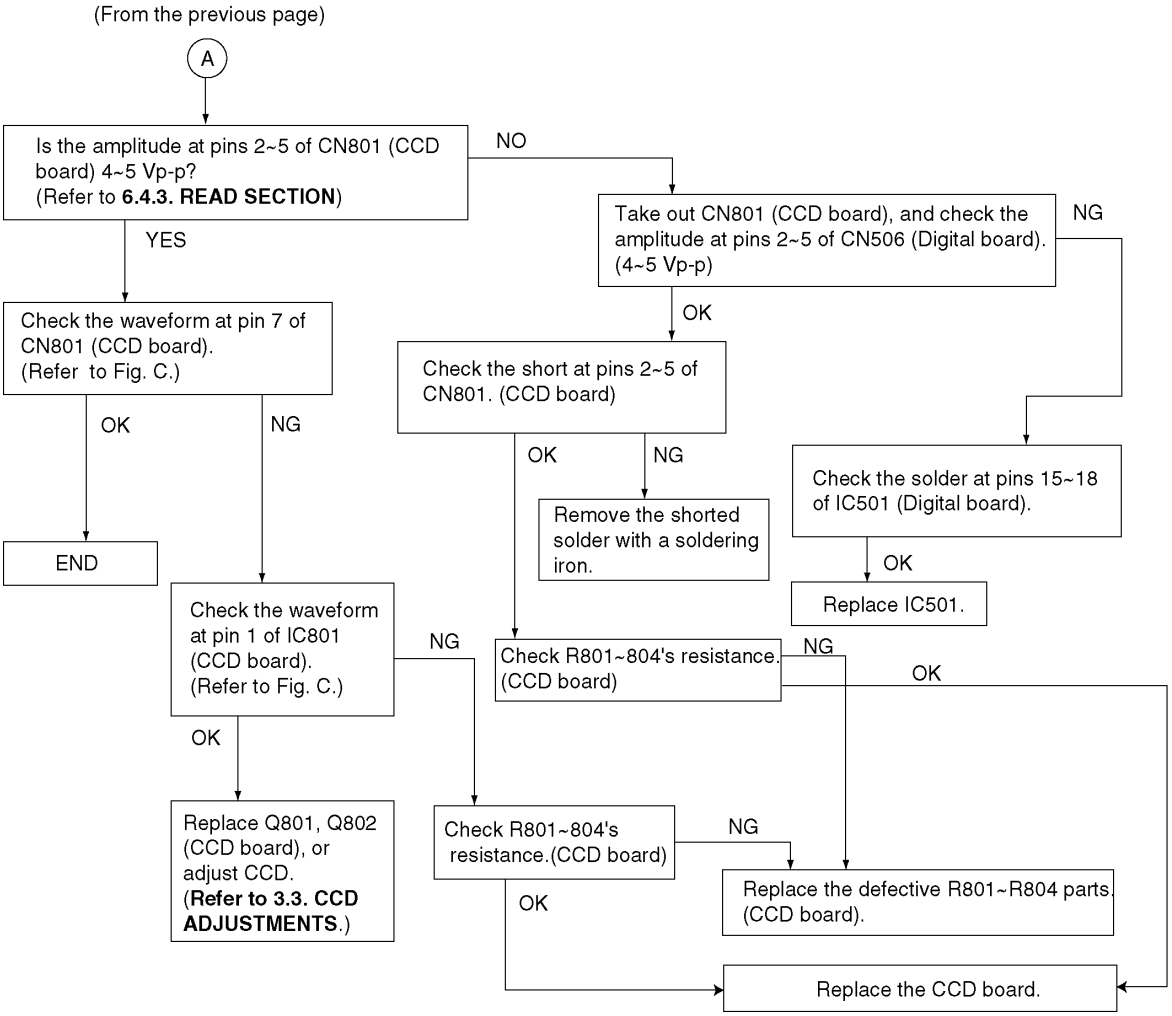


***We recommend making a copy of the Fig. A document in 3. Multiple feed and using it.**

11. **A blank page is copied.**



***We recommend making a copy of the Fig. A document in multiple feed and using it.**



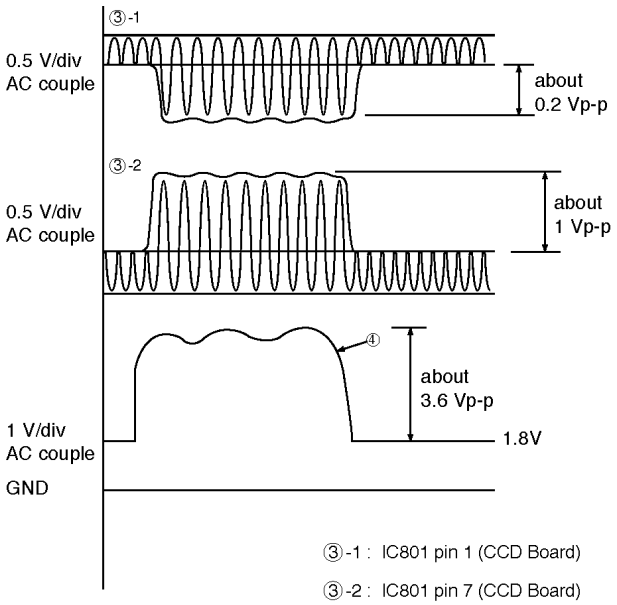
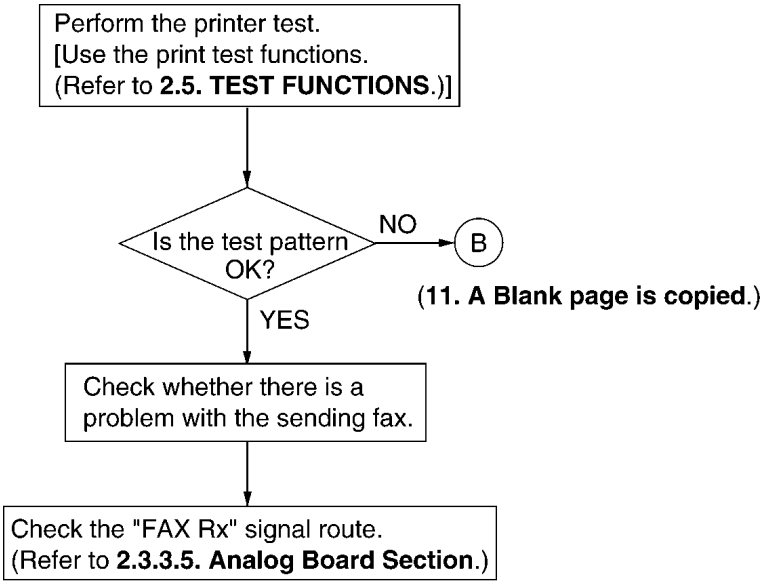


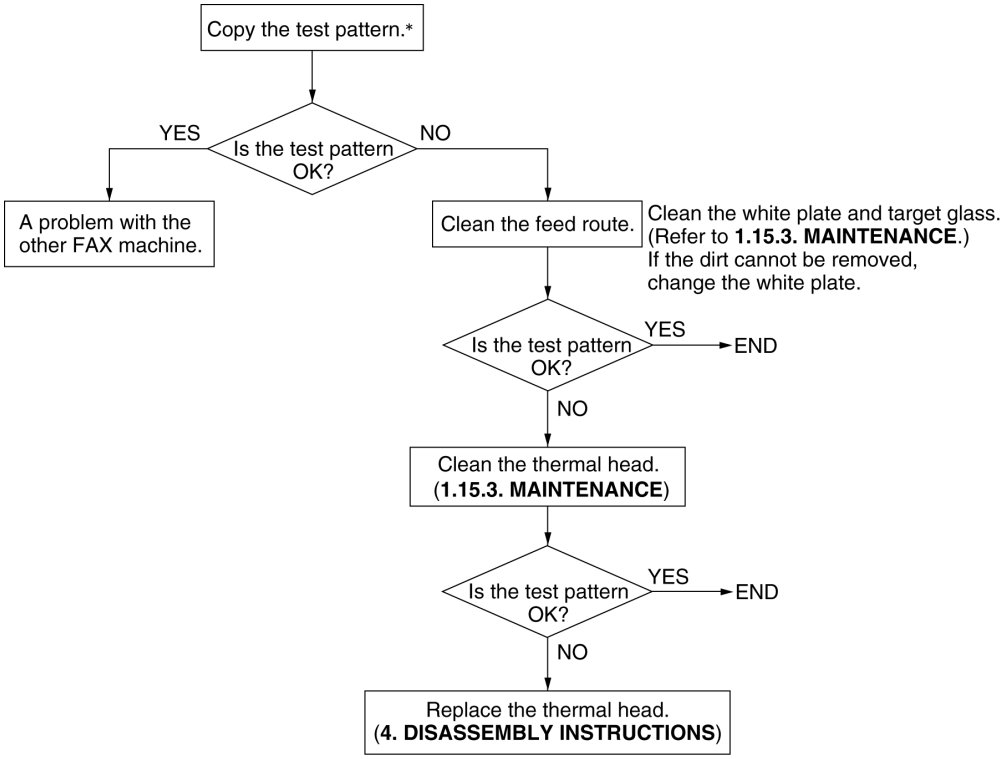
Fig. C

*** When replacing the CCD board, perform the CCD adjustment. (3.3 CCD ADJUSTMENTS)**

12. **A blank page is received.**

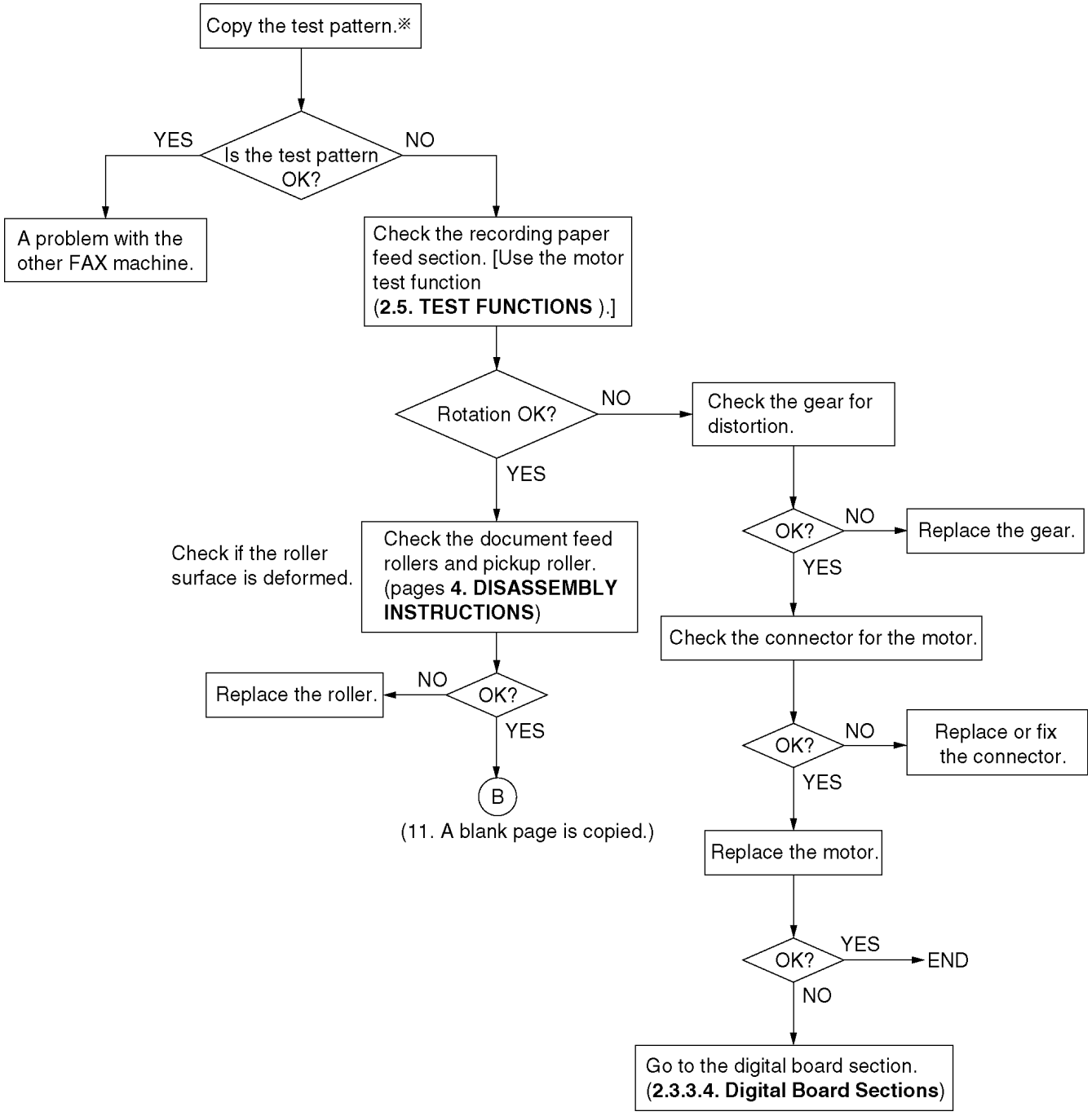


13. **Black or white vertical line**



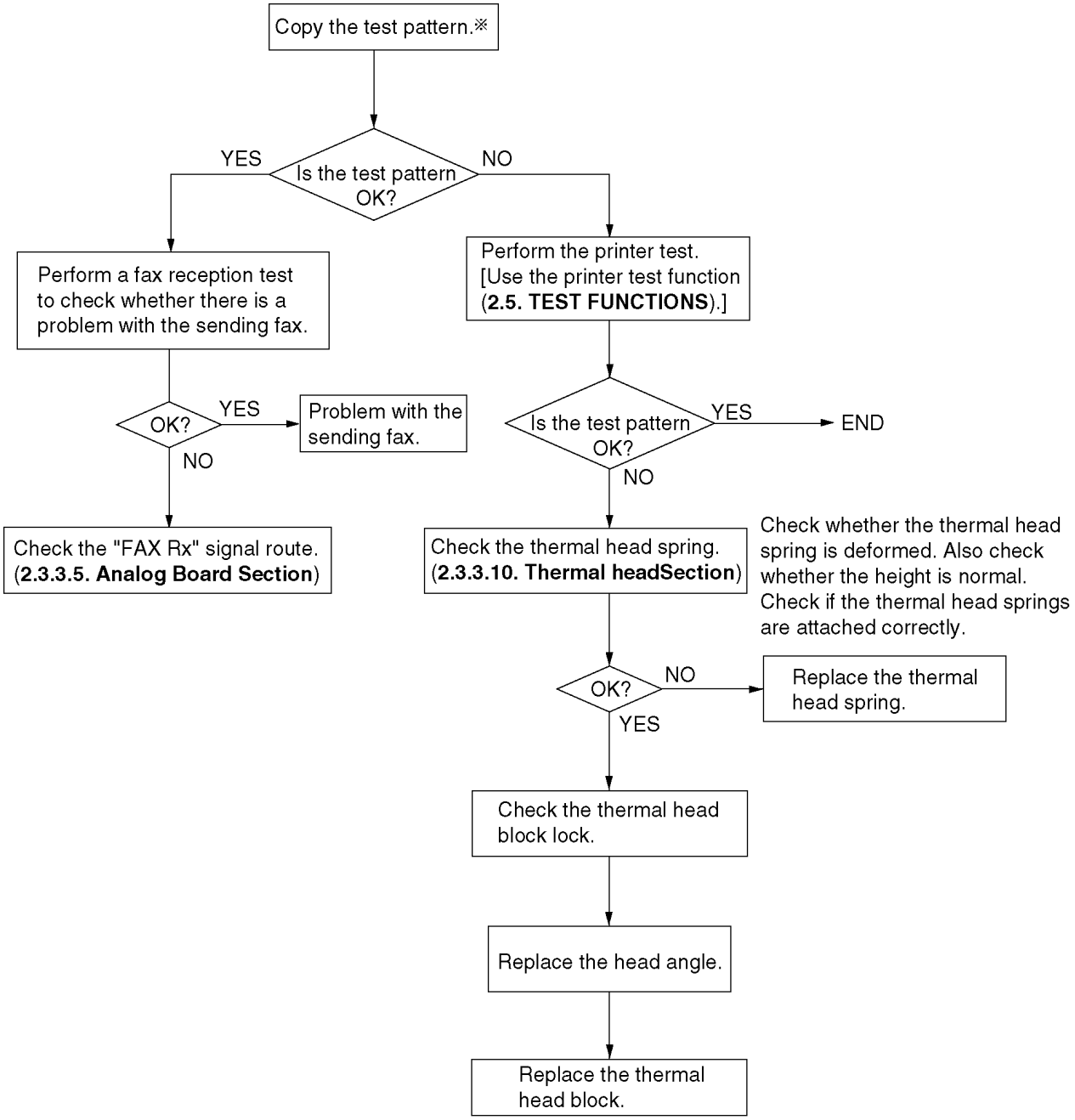
***We recommend making a copy of the Fig. A document in multiple feed and using it.**

14. **Black or white lateral line on print out**



***We recommend making a copy of the Fig. A document in multiple feed and using it.**

15. **An abnormal image is printed.**



***We recommend making a copy of the Fig. A document in multiple feed and using it.**

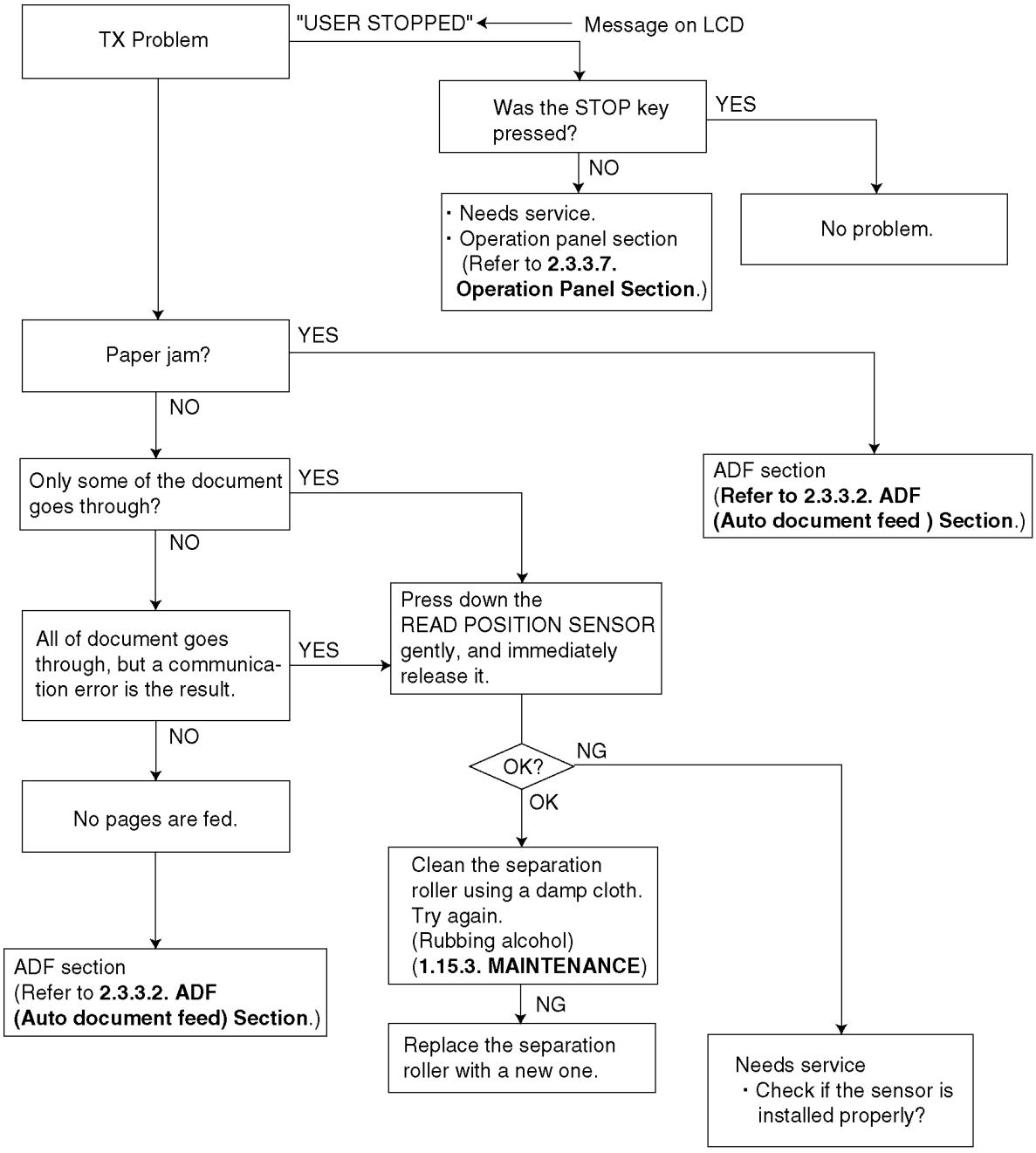
2.3.3.3. Communication Section

Find the problem in the table shown below, and refer to the corresponding troubleshooting procedure in **2.3.3.3.1 Defective facsimile section**.

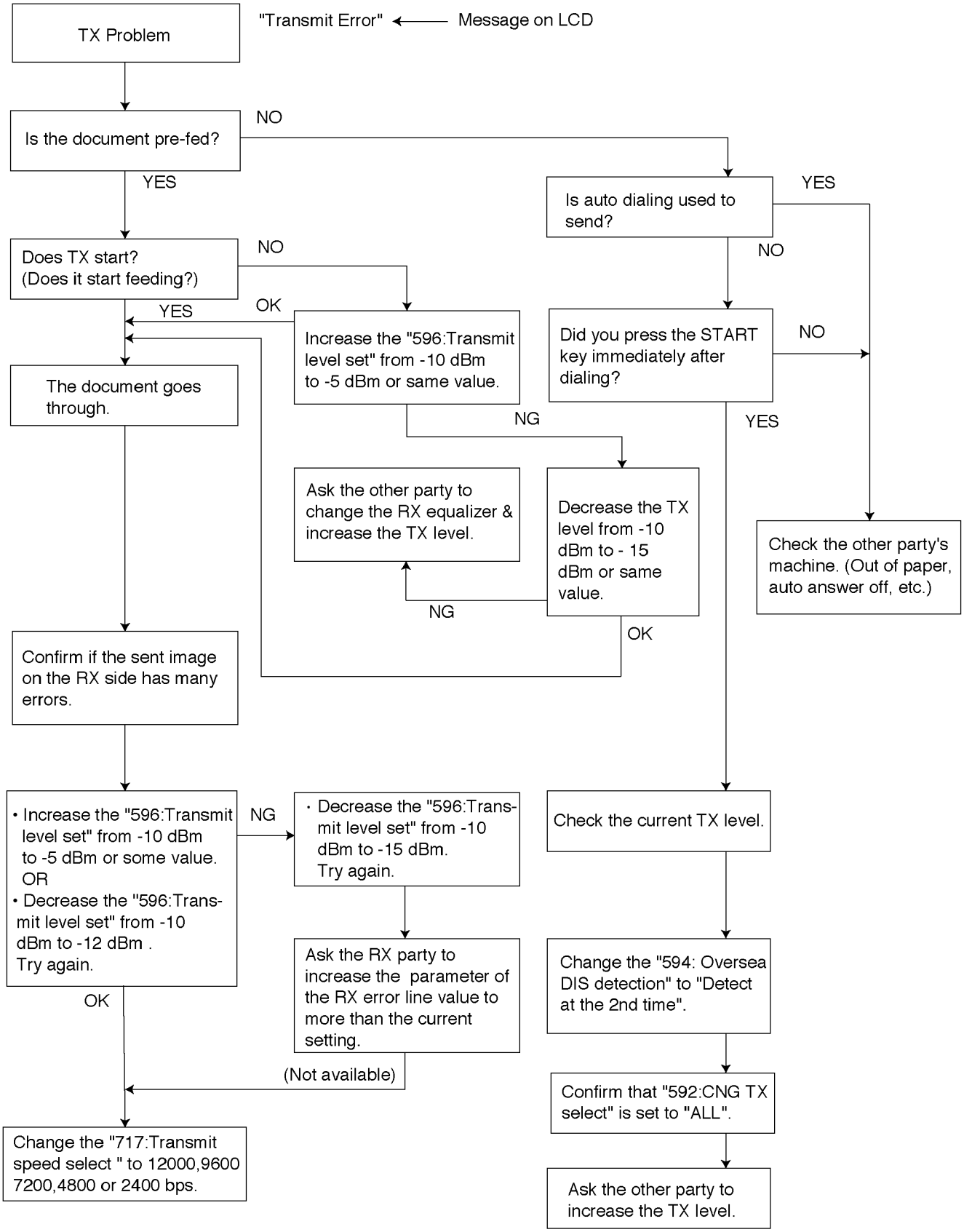
No.	Symptom	Content	Possible cause
1	The paper does not feed properly when faxing. (Copying is also not possible.)	Troubleshooting	Problem with the feeding mechanism.
2	The fax transmits successfully one time and fails another. (Copying is also possible.)	Troubleshooting	Problem with the service line or with the receiver´s fax.
3	The fax receives successfully one time and fails another. (Copying is also possible.)	Troubleshooting	Problem with the service line or with the transmitter´s fax.
4	The fax completely fails to transmit or receive. (Copying is also possible.)	Troubleshooting	Problem with the electric circuit.
5	The fax fails either to transmit or receive when making a long distance or international call. (Copying is also possible.)	Detailed description of the possible causes (Similar to troubleshooting items No.2 and No.3.)	Problem with the service line.
6	The fax image is poor when transmitting or receiving during a long distance or international call.		
7	No.1-No.5	The troubleshooting procedure for each error code will be printed on the communication result report.	

2.3.3.3.1. Defective facsimile section

1. **Transmit problem**



2. **Sometimes there is a transmit problem.**

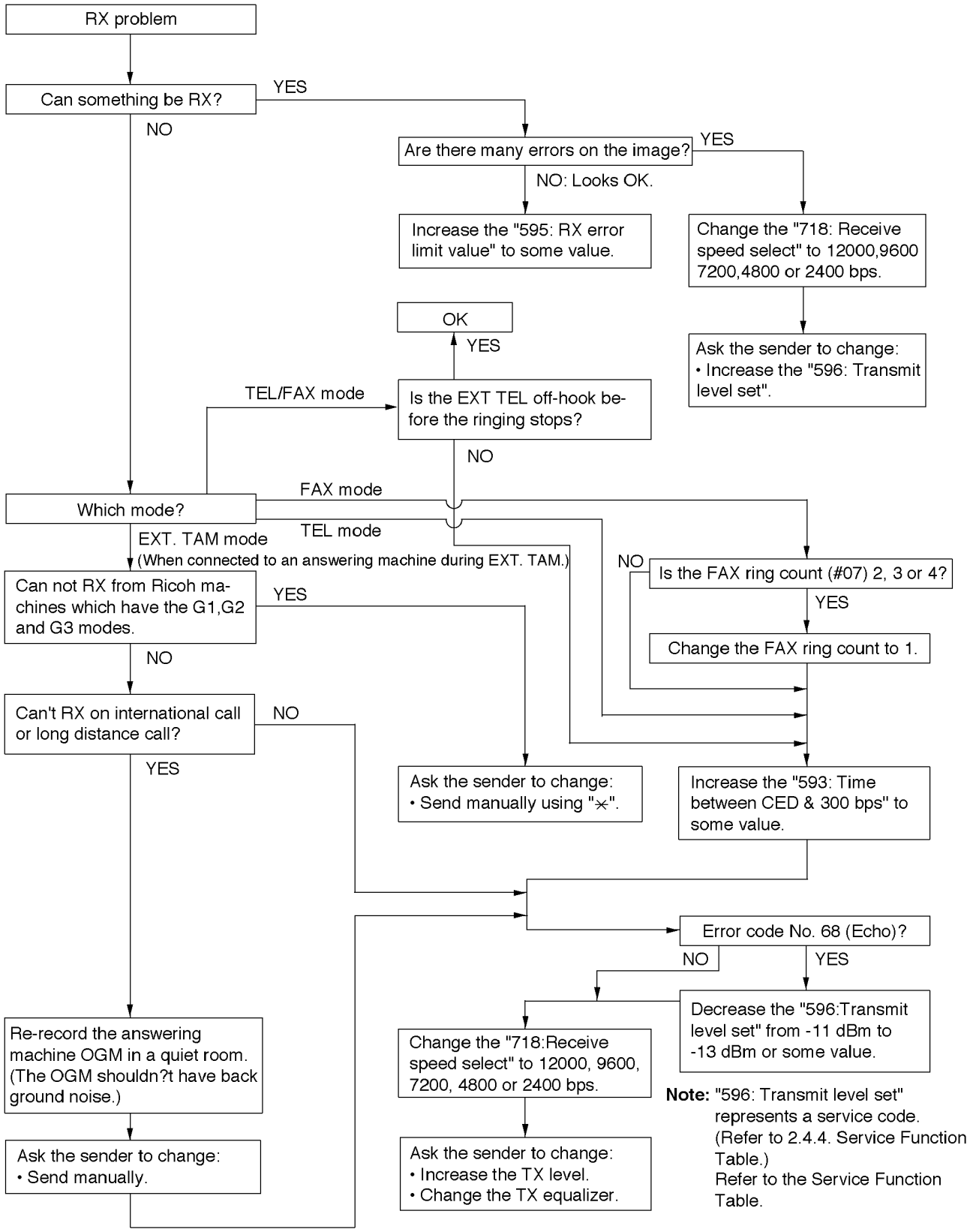


Note:

"596: Transmit level set" represents a service code. (Refer to **2.4.4. Service Function Table**.)
Refer to the Service Function Table.

3. **Receive problem**

Confirm the following before starting troubleshooting.
Is the recording paper installed properly? Refer to Remarks.



Note:

"596: Transmit level set" represents a service code. (Refer to **2.4.4. Service Function Table**.)
Refer to the Service Function Table.

Remarks:

For the receiving problem, we have thought of causes other than in the software. Some causes may be when the fax changes to the memory receiving mode (for example, when out of paper), and the memory becomes full of the unprinted fax data. In this case, [MEMORY FULL] and its main cause (for example, "CHECK PAPER") are displayed on the LCD. Accordingly, by solving the main problem, [MEMORY FULL] can be canceled and the receiving problem can be resolved. The causes of the display errors are shown below.

CHECK PAPER (Prüfe Papier)

CHECK COVER (Deckel prüfen)

FILM EMPTY (Film erschöpft)

UNIT OVERHEATED (Empf. Fehler) (COVER OPEN, etc.) ...Reset the unit.

PAPER JAMMED (Papierstau)

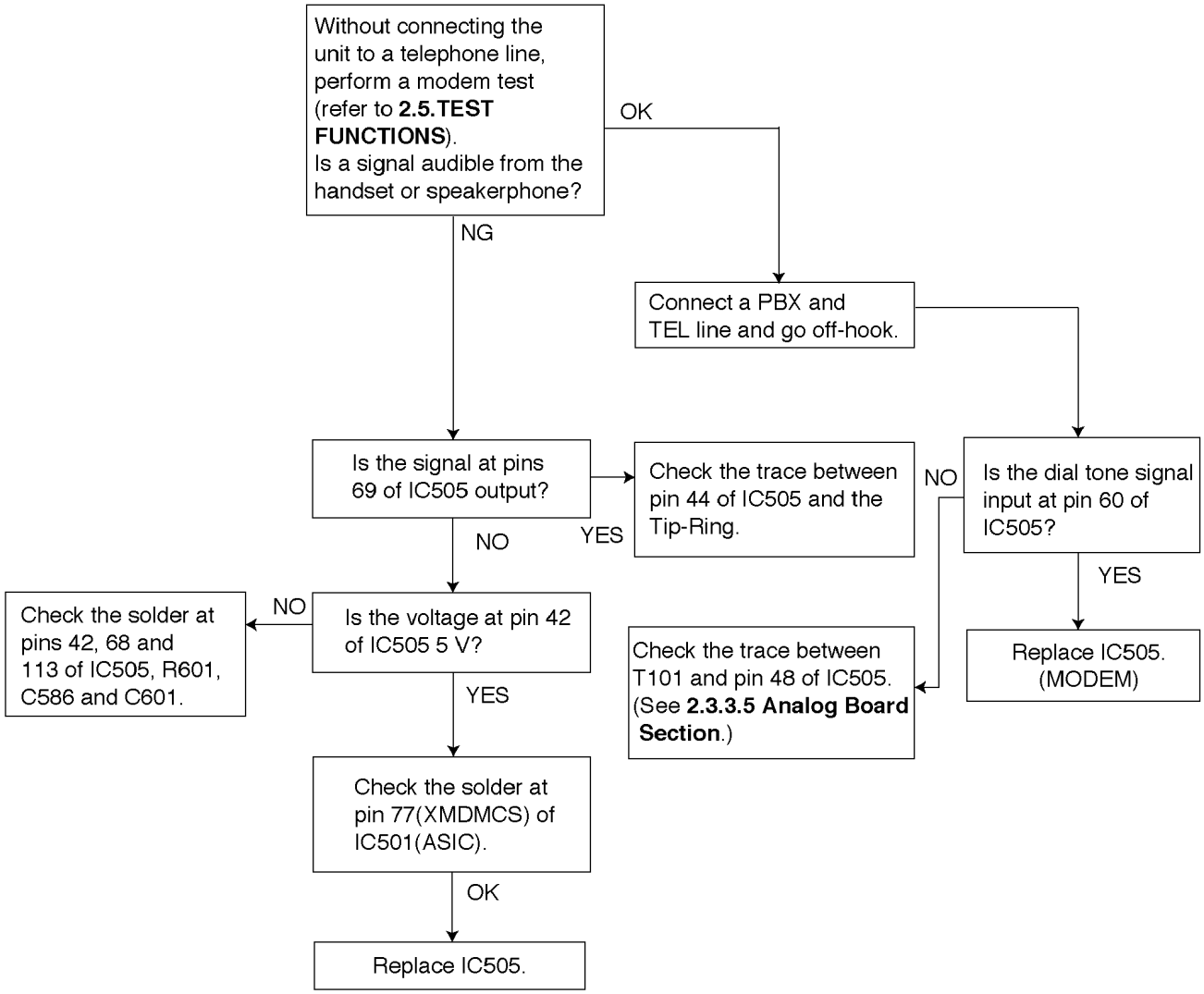
CHECK FILM (Film prüfen)

Please refer to **2.2. User Recoverable Errors** for the above items.
Also, when it actually brcomes a hardware deformity, please check each sensor. (Refer to **2.5. TEST FUNCTIONS**.)

Note:

Words in brackets ( ) are German. A translated version for each market is available with this model series.

4. **The unit can copy, but cannot transmit/receive.**



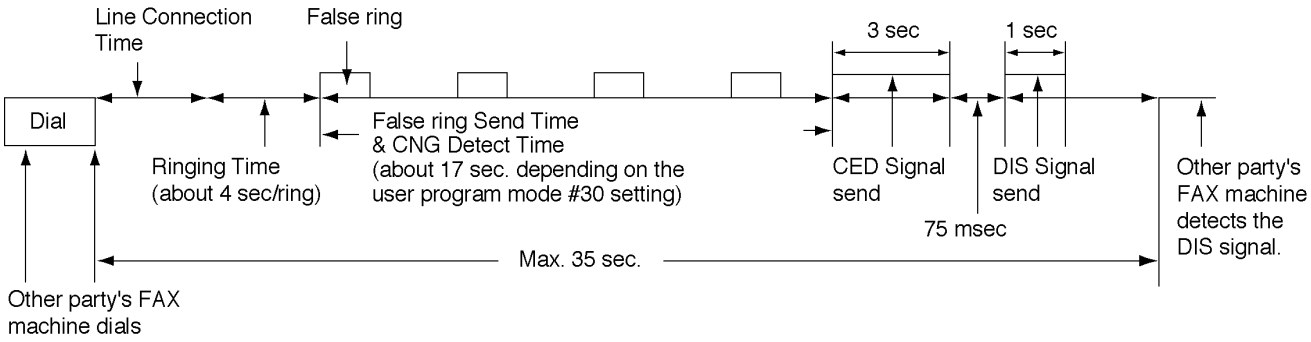
5. **The unit can copy, but cannot either transmit/receive long distance or international communications.**

The following 2 causes can be considered for this.

Cause 1:

The other party is executing automatic dialing, the call has been received by this unit, and the CED or DIS signal response time is too long. (In most cases, this unit detects the CNG signal and can respond to CED or DIS.) (According to the ITU-T standard, the communication procedure is stopped when there is no response from the other party within 35 sec, so that the other party releases the line.)

(Response Time)



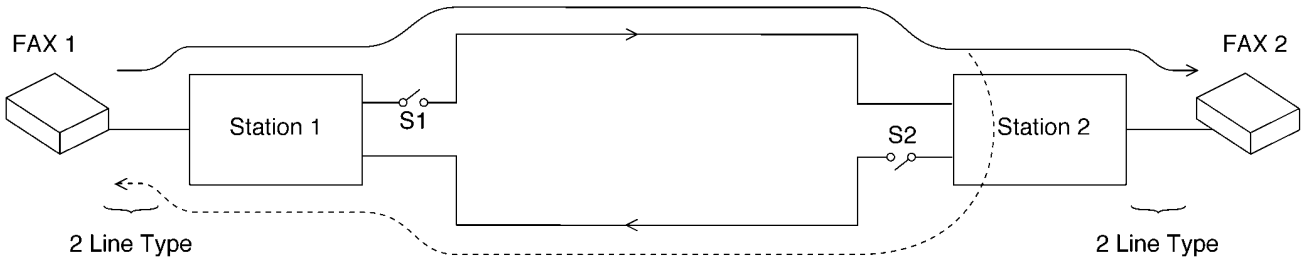
(Cause and Countermeasure)

As shown in the chart above, the total handshaking time must be reduced, but because of the long distance connection and linking of several stations, the line connection time cannot be reduced. Accordingly, the following countermeasures should be tried.

(A)... As the 35 sec. count is started directly after dialing or directly after the START button has been pressed for models with a START button, the other party should be called manually, if possible. Another possibility is entering two pauses at the end of the auto dial number on the transmission side. Then the count start time can be delayed for 2 pauses (about 10 sec.).

Cause 2:

Erroneous detection because of an echo or an echo canceler.



The sea bottom cable or satellite communication path (4 Line Type)

(Echo/Echo Canceler)

The signal from FAX1 reaches FAX2 via stations 1 and 2, but the reflection signal at station 2 also returns via station 1 (echo). As the distance between station 1 and station 2 is far, the echo returns to FAX 1 at a max of 600 msec after transmission. There is a possibility that this signal is detected erroneously as the signal from FAX2. For a normal call, there is also a possibility that the echo of their own voice will make the call difficult to understand. For this reason, each station (station 1 and station 2) attaches echo cancelers (S1 and S2) for international lines or long distance lines. For the echo canceler, the level of the transmission signal from FAX 1 is compared with the level of the reception signal from FAX2. When the transmission signal is larger, S1 is closed while S2 is opened when it is smaller. In other words, for transmission from FAX1, S1 is closed and S2 is open, so that the echo does not return to FAX1.

(Causes and Countermeasures)

(Cause A)

When a training signal is transmitted from FAX1 during the communication procedure at the time of transmission from FAX1 to FAX2, there is a delay until the echo canceler operates. S1 is closed so that a part of the head of the training signal may drop out. Normal reception by FAX2 may not be possible, and transmission may not be started.

(Countermeasure A)

When the international line mode is ON in the service mode (code No. 521), a dummy signal is attached to the head of the training signal to prevent this problem. As this normally is ON, it is necessary to reconfirm that this has not become OFF. When the international mode is switched OFF, the transmission side will try the training signal three times at each speed (9600BPS, 4800BPS and 2400BPS). If NG, it will drop the speed by one rank (fall-back). When the international mode is switched ON, each speed will be tried only twice. In other words, the slower speed with fewer errors can be accessed more easily. This is done because the line conditions may deteriorate and the picture may be disturbed more easily during communication for international lines or long distance communication, even when the training is OK. The default value is ON as preference is given to clearer pictures rather than speed.

(Cause B)

The echo canceler operation is stopped with a 2100Hz signal. (i.e. S1 and S2 become ON).Accordingly, when FAX1 has executed automatic reception, a CED signal is output. If this signal is 2100Hz, S1 and S2 will become ON. Then the echo of the DIS signal output afterwards may be received and FAX1 may execute an erroneous operation, preventing communication from starting.

(Countermeasure B)

In the service mode, the CED signal frequency is set to 1100 Hz (code No.520), or the time setting between the CED signal and the DIS signal is set from 75 msec to 500 msec in the service mode (code No.593). This is because the echo canceler operation stop mode is canceled by an interval of 250 msec or more.
Reduce receiving sensitivity to reduce the effect to RVC echo signal. (Service mode: No.598)

(Cause C)

This model is FAX1 and the other party is FAX2.For transmission from this model to FAX2, FAX2 executes automatic reception and transmits a CED signal (2100 Hz) followed by a DIS signal. As the echo cancelers stops as described in cause B, the echo of the DIS signal returns to FAX2. On the other hand, this model detects the DIS signal and transmits a DCS signal. In other words, it is possible that the echo of the DIS signal and the DCS signal transmitted from this model reach FAX2 one after the other. FAX2 defect an error and communication is not started.

(Countermeasure C)

When the international DIS detection setting is set in the service mode (code No.594), this model does not respond to the first DIS signal and returns a DCS signal only for the second DIS signal.In other words, there is an interval of 250 msec between transmission of the first and second DIS signal so that the echo cancelers operation recovers. An echo is not generated for the second DIS signal.

Note:

When the other FAX does not respond with a DCS signal after DIS signal transmission, the DIS signal is transmitted three times for trial.

Summary:

Long distance and international communication operations

SYMPTOM	COUNTERMEASURE
Does not receive in the automatic mode.	1. If possible, manual transmission should be done from the transmission side. 2. If possible, two pauses should be inserted at the end of the auto dial number on the transmission side. 3. If possible, the Function Selector Switch should be switched to FAX. 4. If possible, the Function Selector Switch should be switched to FAX.
Does not transmit.	1. Confirm the international line mode is ON. (Service mode: code No. 521) 2. Enable the international DIS detection setting. (Service mode: code No. 594)
Does not receive.	1. Set the time between the CED signal and the DIS signal to 500 msec. (Service mode: code No. 593) 2. Set the CED frequency to 1100Hz. (Service mode: code No. 520) 3. Reduce the RCV sesitivity. (Service mode: code No. 598)

6. **The unit can copy, but the transmission and reception image are incorrect.**

(Long distance or international communication operation)

This widely depends on the transmission and reception capability of the other FAX unit and the line conditions. The countermeasures for this unit are shown below.

Transmission Operation:

Set the transmitting speed to 4800BPS (service mode: code No. 717) or select the overseas mode.

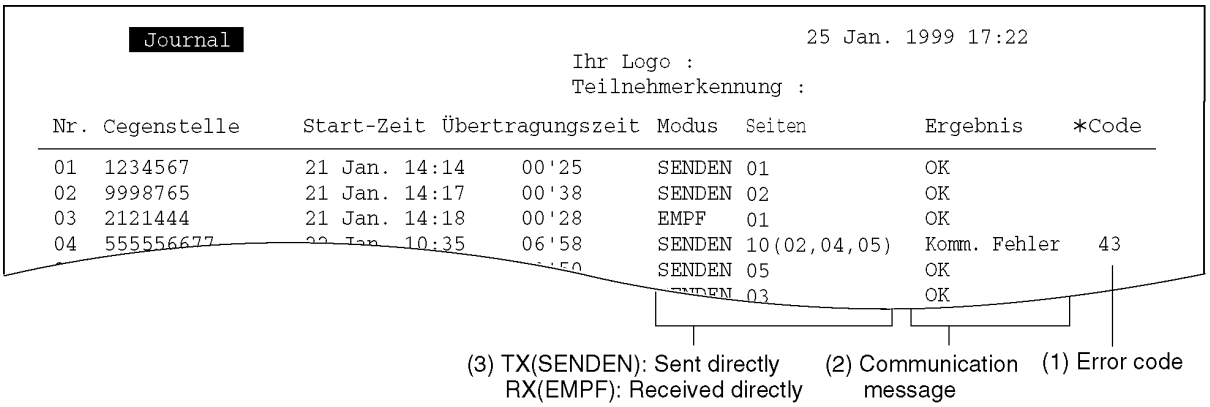
Reception Operation:

If 80% or more of the reception is incorrect, set the receiving speed to 4800BPS. (Service mode: code No. 718)

・Refer to **2.4.4. SERVICE FUNCTION TABLE**.

7. **How to output the Journal Report:**
   a. Press the MENU button 3 times.
   b. Press the START/SET button and VOLUME(▲) button 3 times.
   c. Press the START/SET button.
   d. Print out.

Sample of transmission report



Error code table:

(1) CODE	(2) RESULT	(3) MODE	SYMPTOM	Counter-measure*
A2	PRESSED THE STOP KEY (Stop-Taste gedückt)	TX(SENDEN) & RX(EMPF)	Communication was interrupted with the STOP button.	
A3	DOCUMENT JAMMED (Fehleinzug)	TX(SENDEN)	Document paper is jammed.	
A4	NO DOCUMENT (Kein Dokument)	TX(SENDEN)	No document paper.	
A7	THE COVER WAS OPENED (Deckl offen)	TX(SENDEN) & RX(EMPF)	Cover is open.	
A9	COMMUNICATION ERROR (Komm. Fehler)	TX(SENDEN) & RX(EMPF)	DC LOOP detection/Busy Tone detection.	
26	COMMUNICATION ERROR (Komm. Fehler)	RX(EMPF)	DIS is received after transmission.	
27	COMMUNICATION ERROR (Komm. Fehler)	RX(EMPF)		
28	COMMUNICATION ERROR (Komm. Fehler)	TX(SENDEN) & RX(EMPF)		
40	NO RESPONSE (Keine Antwort)	TX(SENDEN)	Transmission is finished when T1 TIMER is expired.	1
41	COMMUNICATION ERROR (Komm. Fehler)	TX(SENDEN)	DCN is received after DCS transmission.	2
42	COMMUNICATION ERROR (Komm. Fehler)	TX(SENDEN)	FTT is received after transmission of a 2400BSP training signal.	3
43	COMMUNICATION ERROR (Komm. Fehler)	TX(SENDEN)	No response after post message is transmitted three times.	4
44	COMMUNICATION ERROR (Komm. Fehler)	TX(SENDEN)	RTN and PIN are received.	5
46	COMMUNICATION ERROR (Komm. Fehler)	RX(EMPF)	No response after FTT is transmitted.	6
48	COMMUNICATION ERROR (Komm. Fehler)	RX(EMPF)	No post message.	7
49	COMMUNICATION ERROR (Komm. Fehler)	RX(EMPF)	RTN is transmitted.	8
50	COMMUNICATION ERROR (Komm. Fehler)	RX(EMPF)	PIN is transmitted (to PRI-Q).	8
51	COMMUNICATION ERROR (Komm. Fehler)	RX(EMPF)	PIN is transmitted.	8
52	NO RESPONSE (Keine Antwort)	RX(EMPF)	Reception is finished when the T1 TIMER expired.	9
53	COMMUNICATION ERROR (Komm. Fehler)	TX(SENDEN)	DCN is received after transmission of NSC and DTC.	10
54	COMMUNICATION ERROR (Komm. Fehler)	RX(EMPF)	DCN is received after DIS transmission.	11
57	COMMUNICATION ERROR (Komm. Fehler)	TX(SENDEN)	300BPS error.	12
58	COMMUNICATION ERROR (Komm. Fehler)	RX(EMPF)	DCN is received after FTT transmission.	13

(1) CODE	(2) RESULT	(3) MODE	SYMPTOM	Counter-measure*
59	COMMUNICATION ERROR (Komm. Fehler)	TX(SENDEN)	DCN responds to post message.	14
59	COMMUNICATION ERROR (Komm. Fehler)	TX(SENDEN)	DCN responds to post message.	14
64	COMMUNICATION ERROR (Komm. Fehler)	TX(SENDEN)	Polling is not possible.	15
65	COMMUNICATION ERROR (Komm. Fehler)	TX(SENDEN)		
68	COMMUNICATION ERROR (Komm. Fehler)	RX(EMPF)	No response at the other party after MCF or CFR is transmitted.	13
70	COMMUNICATION ERROR (Komm. Fehler)	RX(EMPF)	DCN is received after CFR transmission.	13
72	COMMUNICATION ERROR (Komm. Fehler)	RX(EMPF)	Carrier is cut when image signal is received.	16
73	COMMUNICATION ERROR (Komm. Fehler)	TX(SENDEN) & RX(EMPF)	300BPS error.	
74	JUNKMAIL PROH. REJECT (Empfang abgelehnt)	RX(EMPF)	Junk Mail Prohibitor ID ???	
75	MEMORY FULL (Speicher voll)	RX(EMPF)	The document was not received due to memory full.	
79	CANCELED (ANNULLIERT)	TX(SENDEN)	The multistation transmission is rejected by user.	
FF	COMMUNICATION ERROR (Komm. Fehler)	TX(SENDEN) & RX(EMPF)	Modem error. For the DCN, DCS and other addreviations, refore to **6.6.MODEM SECTION.**	12

TX(SENDEN)=TRANSMISSION RX(EMPF)=RECEPTION

Most fax communication problems can be resolved by the following steps.

a. Change the transmit level. (Service code: 596, refer to **2.4.4. SERVICE FUNCTION TABLE**.)

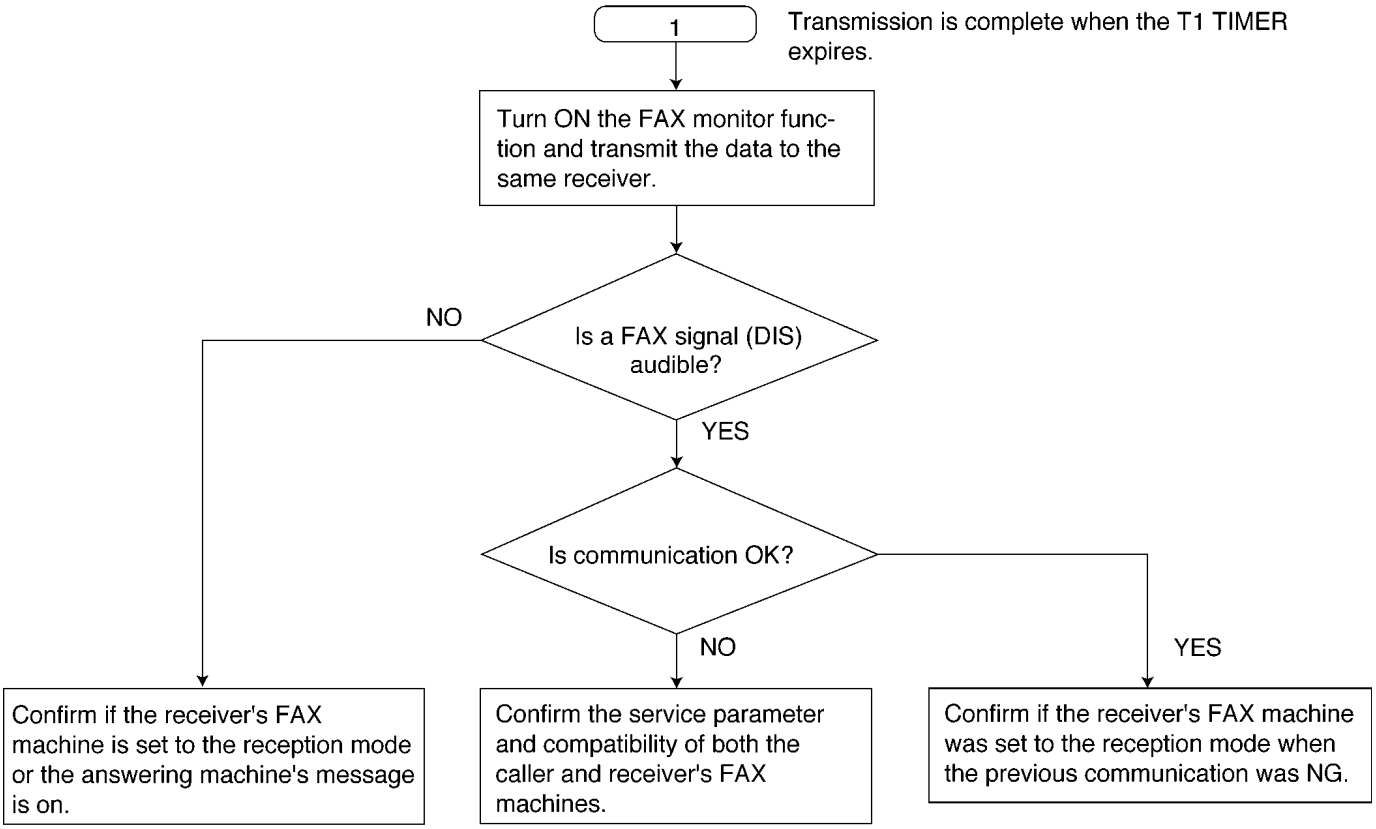
b. Change the TX(SENDEN) speed/RX(EMPF) speed. (Service code: 717/718, refer to **2.4.4. SERVICE FUNCTION TABLE**.)

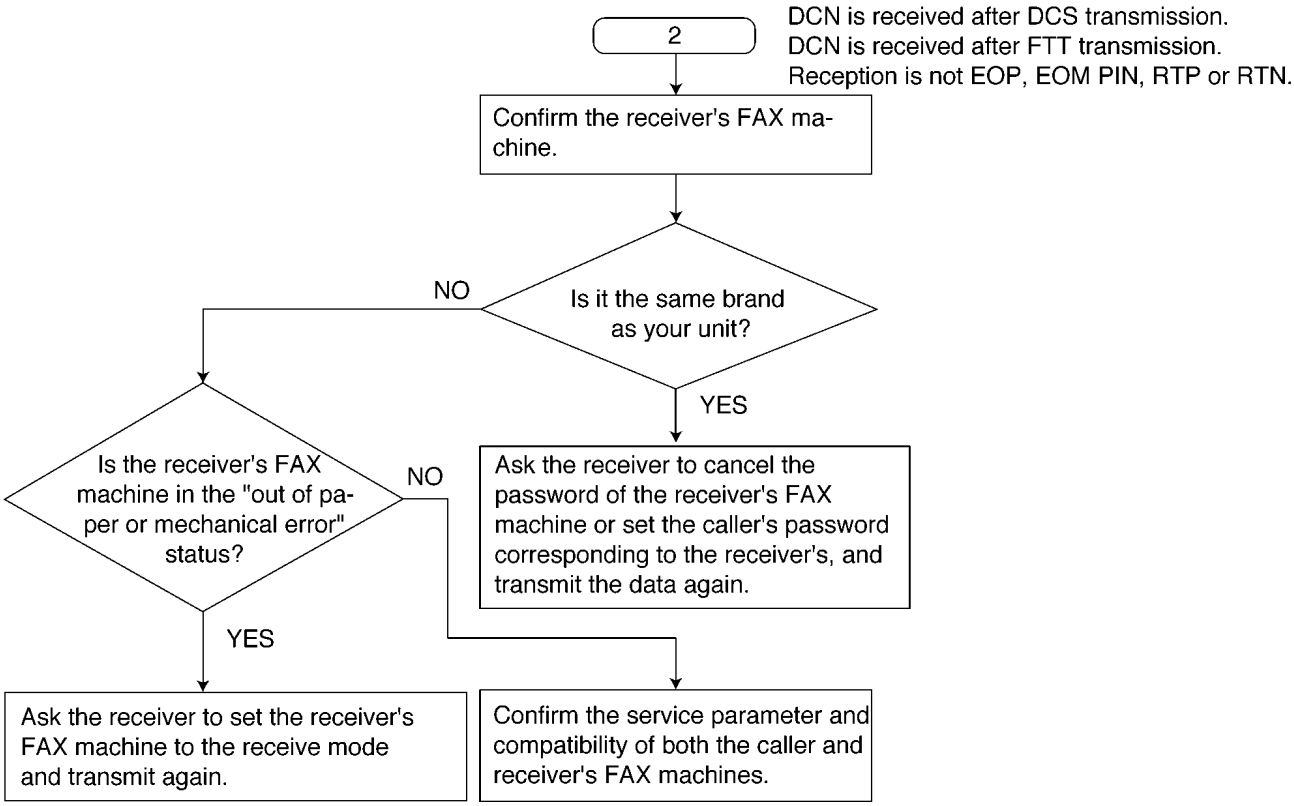
If not resolved, see the **Countermeasure** flow chart.

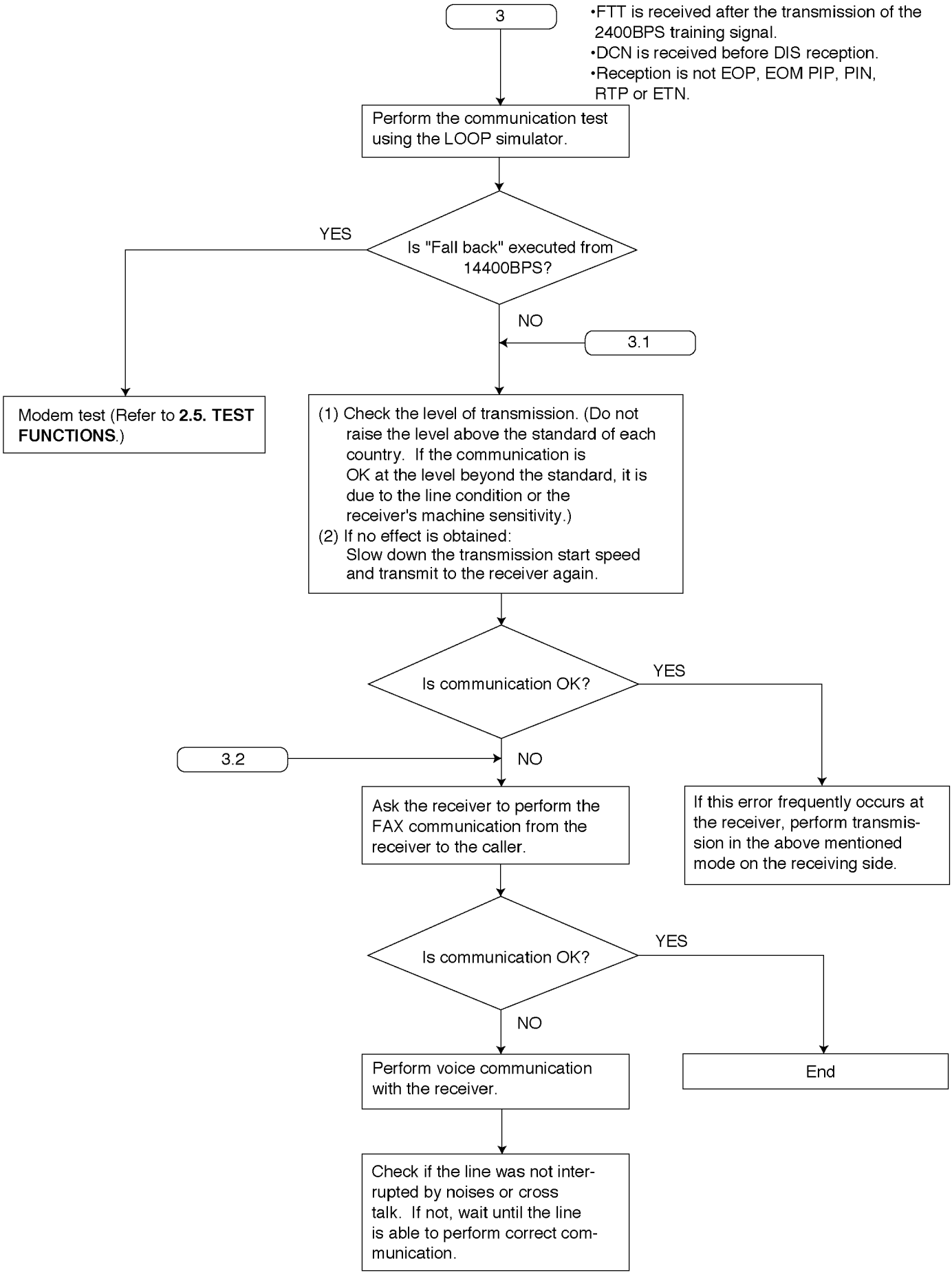
Note:

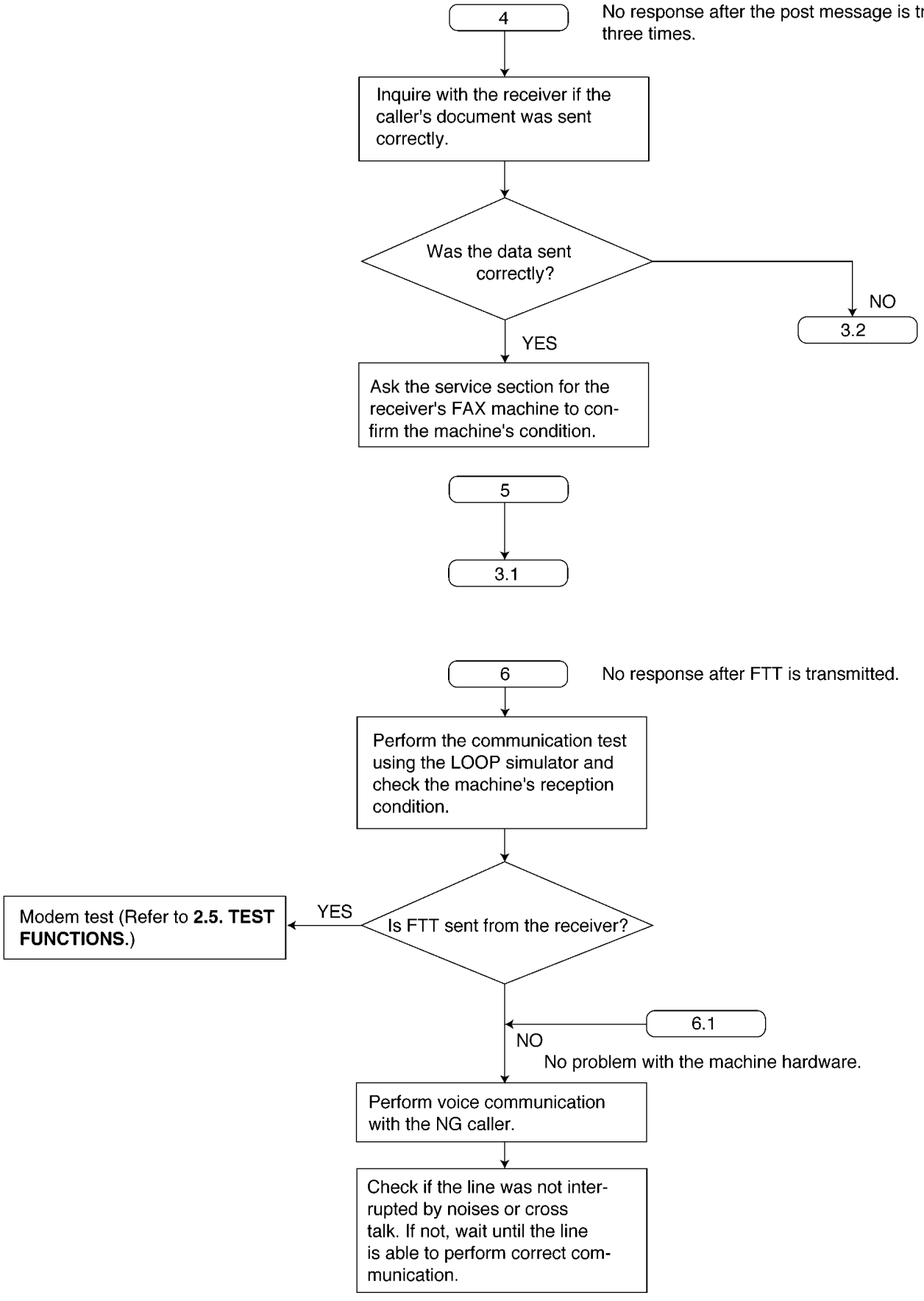
Words in brackets ( ) are German. A translated version for each market is available with this model serise.

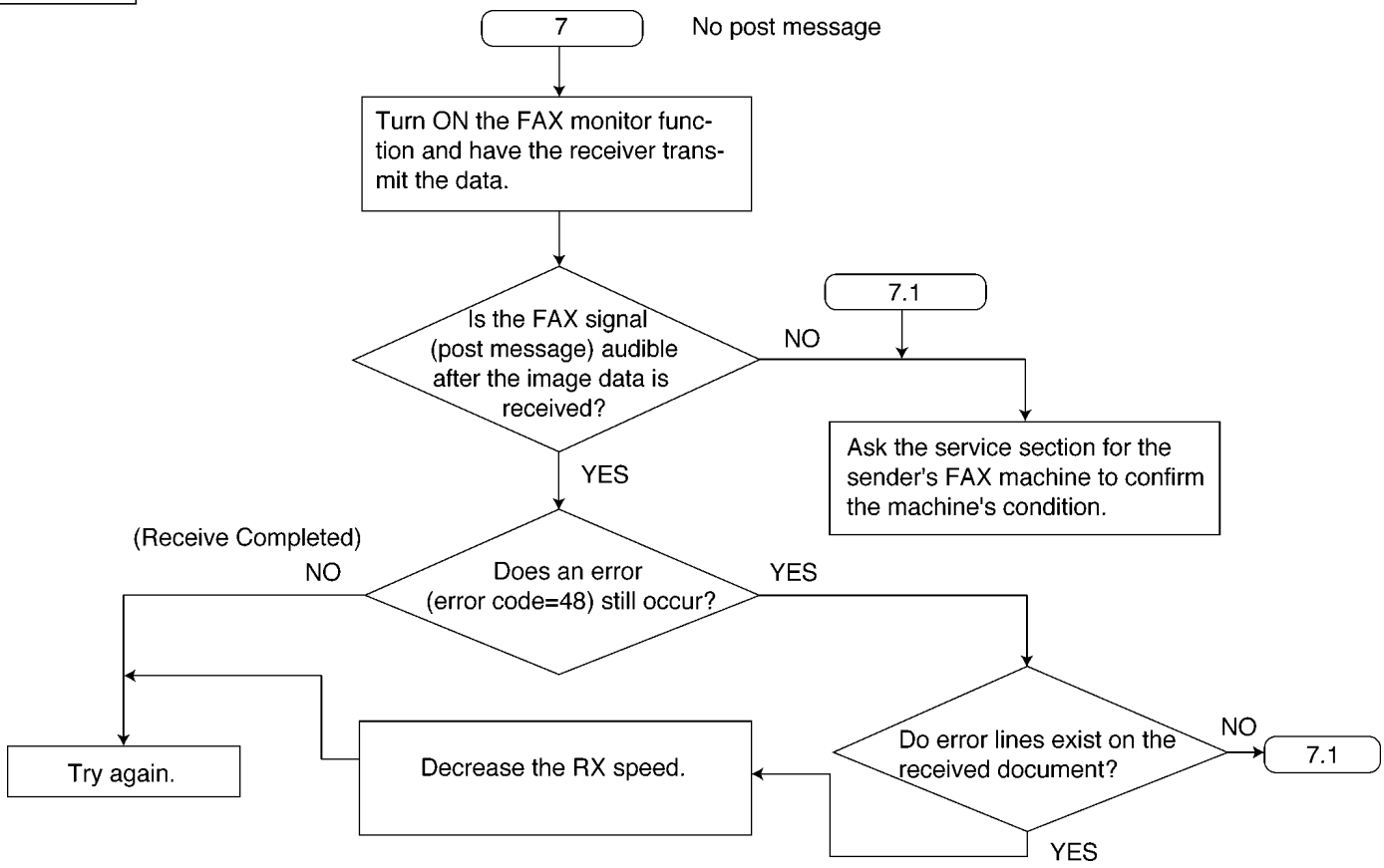
Countermeasure

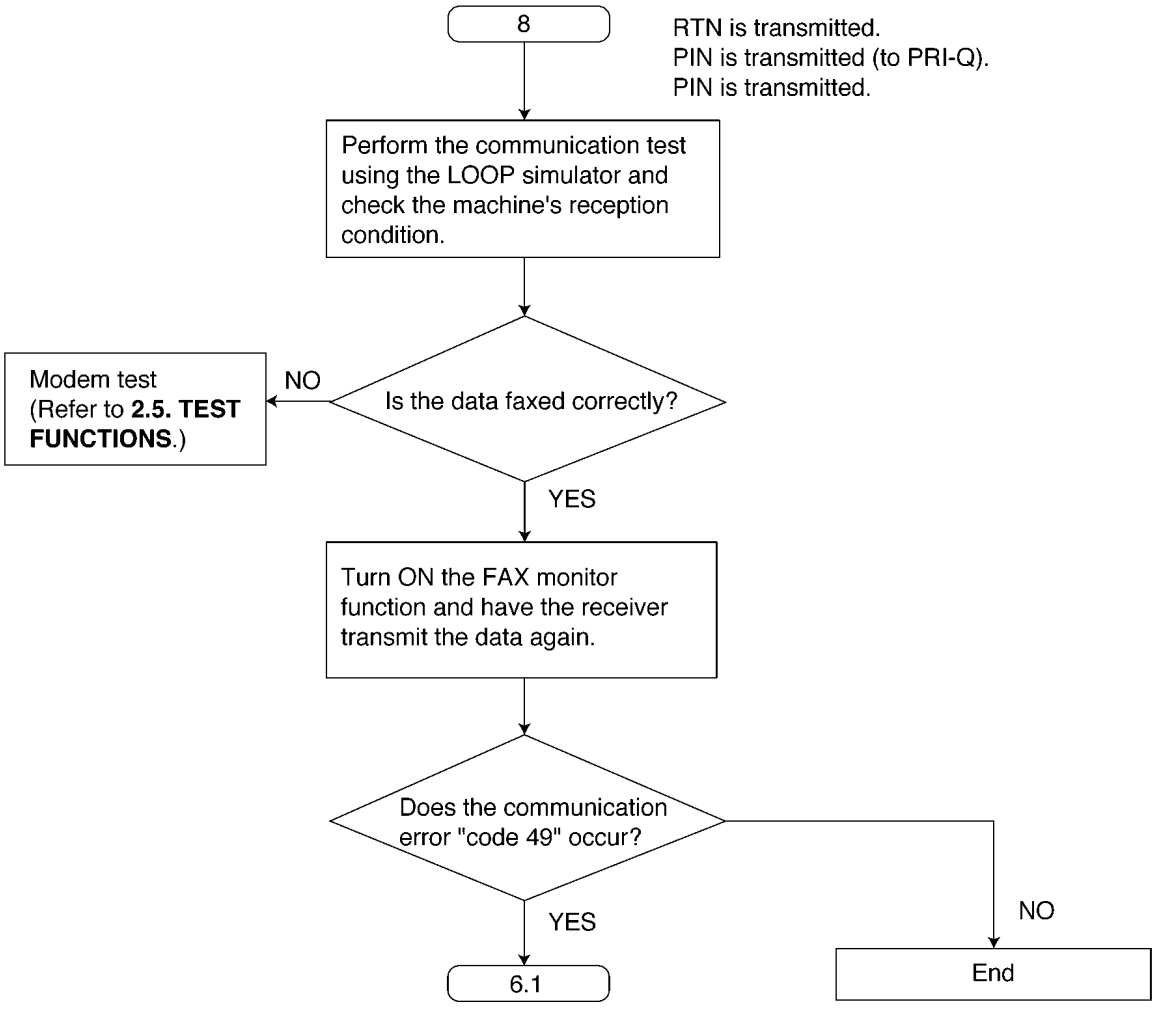


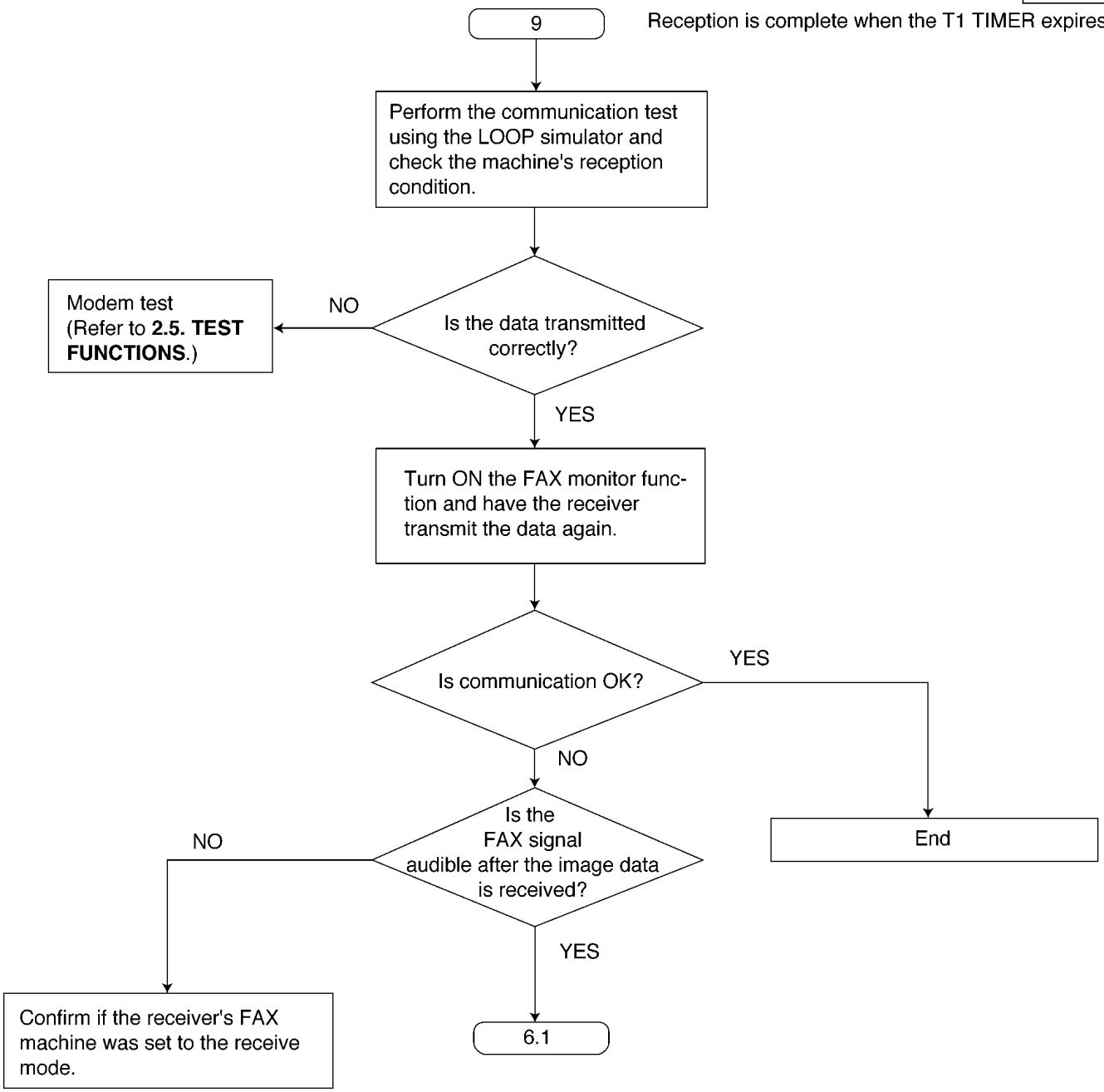


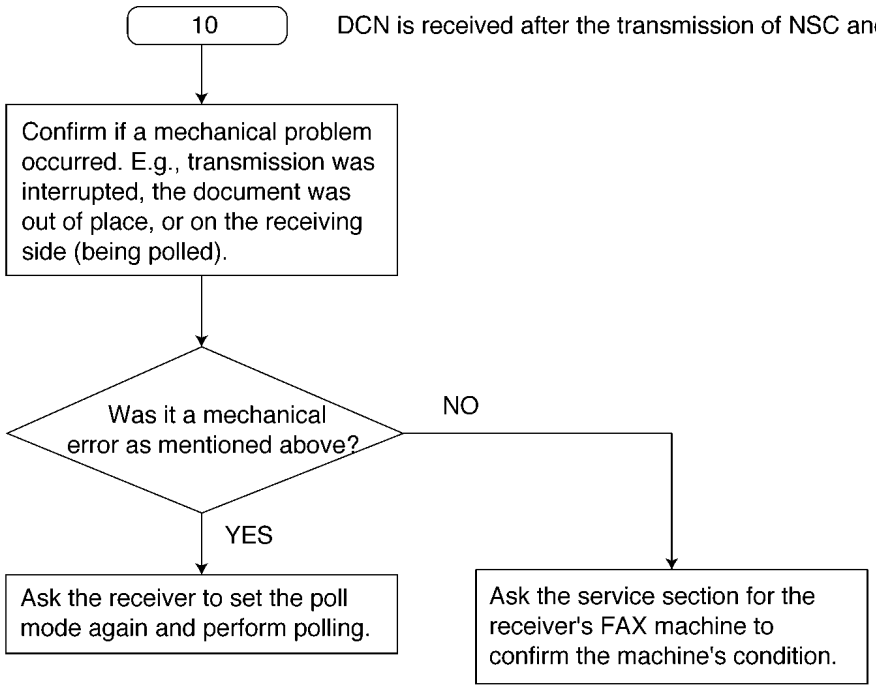

3
•FTT is received after the transmission of the 2400BPS training signal.
•DCN is received before DIS reception.
•Reception is not EOP, EOM PIP, PIN, RTP or ETN.
Perform the communication test using the LOOP simulator.
Is "Fall back" executed from 14400BPS?
YES
NO
3.1
Modem test (Refer to **2.5. TEST FUNCTIONS**.)
(1) Check the level of transmission. (Do not raise the level above the standard of each country. If the communication is OK at the level beyond the standard, it is due to the line condition or the receiver's machine sensitivity.)
(2) If no effect is obtained:
Slow down the transmission start speed and transmit to the receiver again.
Is communication OK?
YES
3.2
NO
Ask the receiver to perform the FAX communication from the receiver to the caller.
If this error frequently occurs at the receiver, perform transmission in the above mentioned mode on the receiving side.
Is communication OK?
YES
NO
Perform voice communication with the receiver.
End
Check if the line was not interrupted by noises or cross talk. If not, wait until the line is able to perform correct communication.

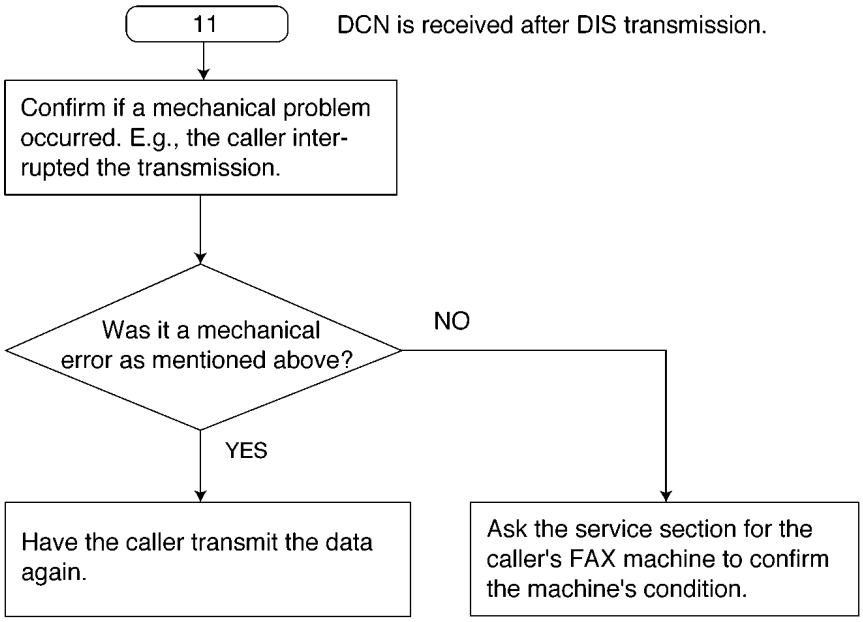

4
No response after the post message is transmitted three times.
Inquire with the receiver if the caller's document was sent correctly.
Was the data sent correctly?
NO
3.2
YES
Ask the service section for the receiver's FAX machine to confirm the machine's condition.
5
3.1
6
No response after FTT is transmitted.
Perform the communication test using the LOOP simulator and check the machine's reception condition.
Is FTT sent from the receiver?
YES
Modem test (Refer to **2.5. TEST FUNCTIONS**.)
6.1
NO
No problem with the machine hardware.
Perform voice communication with the NG caller.
Check if the line was not interrupted by noises or cross talk. If not, wait until the line is able to perform correct communication.

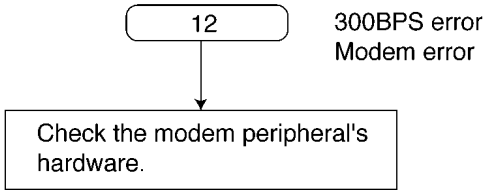

7
No post message
Turn ON the FAX monitor function and have the receiver transmit the data.
Is the FAX signal (post message) audible after the image data is received?
NO
7.1
Ask the service section for the sender's FAX machine to confirm the machine's condition.
YES
(Receive Completed)
NO
Does an error (error code=48) still occur?
YES
Try again.
Decrease the RX speed.
Do error lines exist on the received document?
NO
7.1
YES

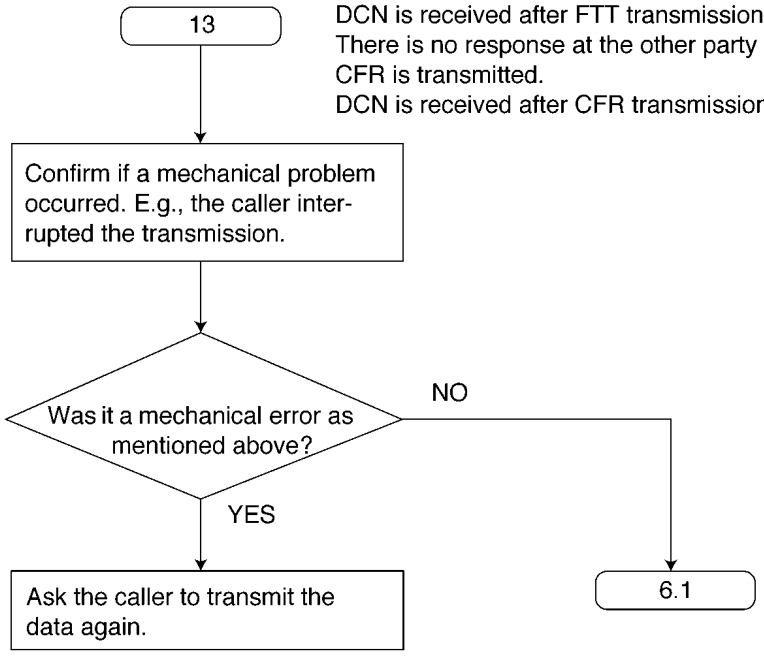

8
RTN is transmitted.
PIN is transmitted (to PRI-Q).
PIN is transmitted.
Perform the communication test using the LOOP simulator and check the machine's reception condition.
Modem test (Refer to **2.5. TEST FUNCTIONS**.)
NO
Is the data faxed correctly?
YES
Turn ON the FAX monitor function and have the receiver transmit the data again.
Does the communication error "code 49" occur?
YES
NO
6.1
End

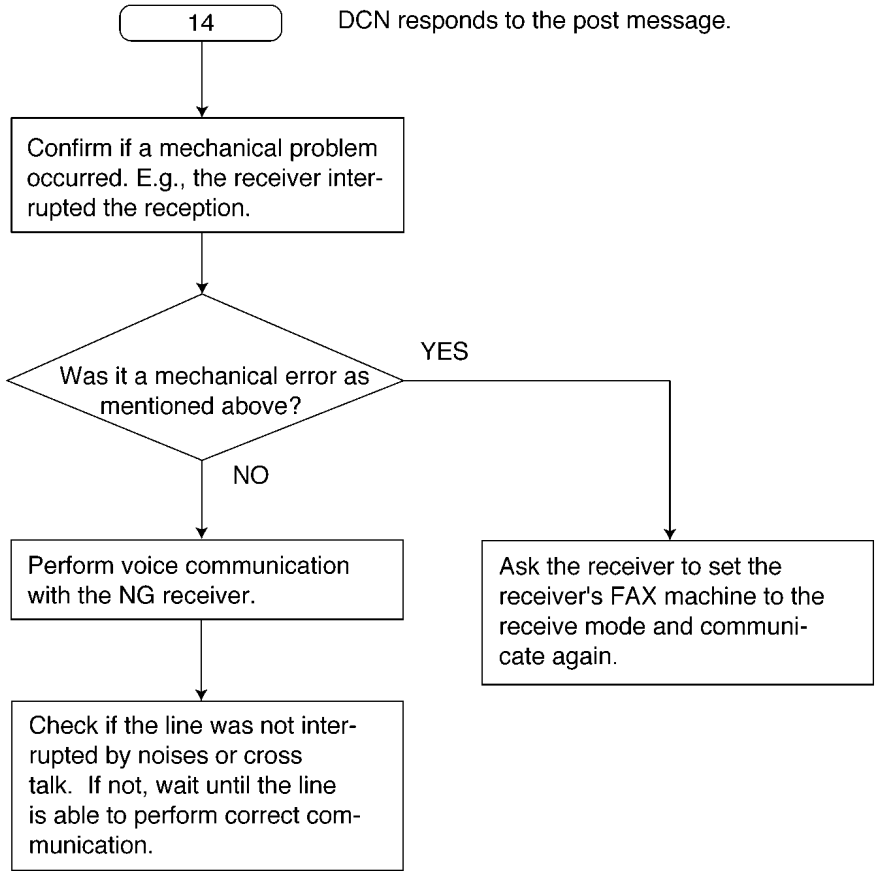

9
Reception is complete when the T1 TIMER expires.
Perform the communication test using the LOOP simulator and check the machine's reception condition.
Is the data transmitted correctly?
NO
Modem test (Refer to **2.5. TEST FUNCTIONS**.)
YES
Turn ON the FAX monitor function and have the receiver transmit the data again.
Is communication OK?
YES
End
NO
Is the FAX signal audible after the image data is received?
NO
Confirm if the receiver's FAX machine was set to the receive mode.
YES
6.1

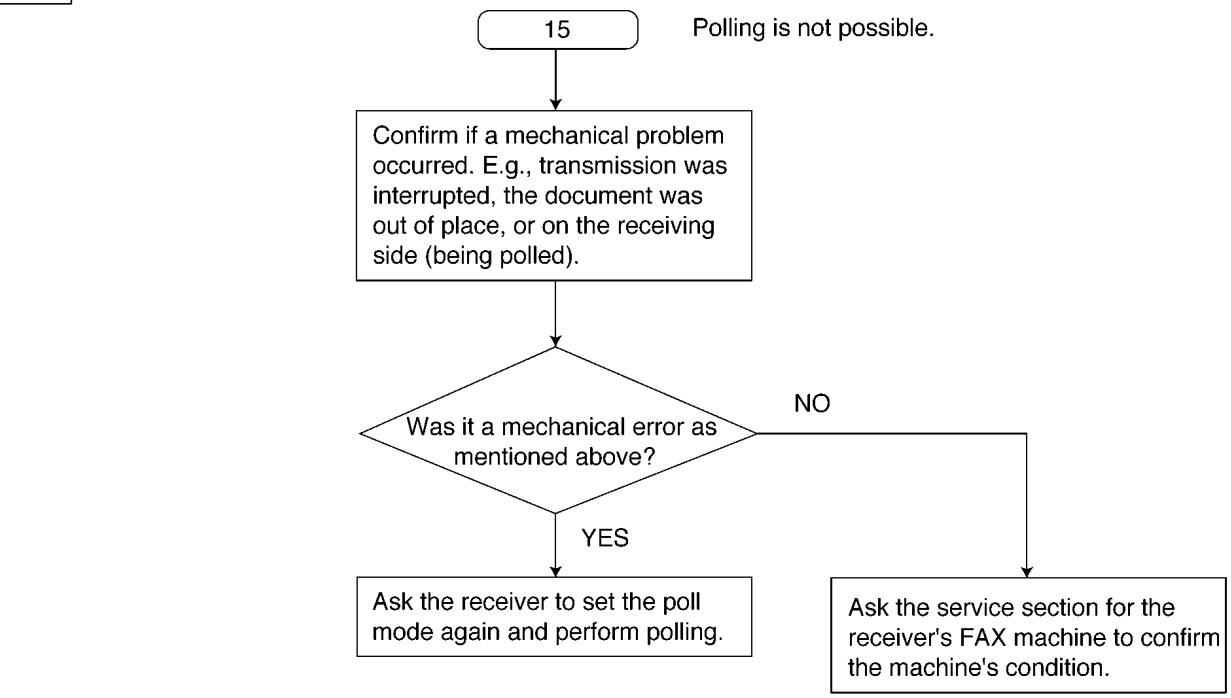

10
DCN is received after the transmission of NSC and DTC.
Confirm if a mechanical problem occurred. E.g., transmission was interrupted, the document was out of place, or on the receiving side (being polled).
Was it a mechanical error as mentioned above?
NO
YES
Ask the receiver to set the poll mode again and perform polling.
Ask the service section for the receiver's FAX machine to confirm the machine's condition.

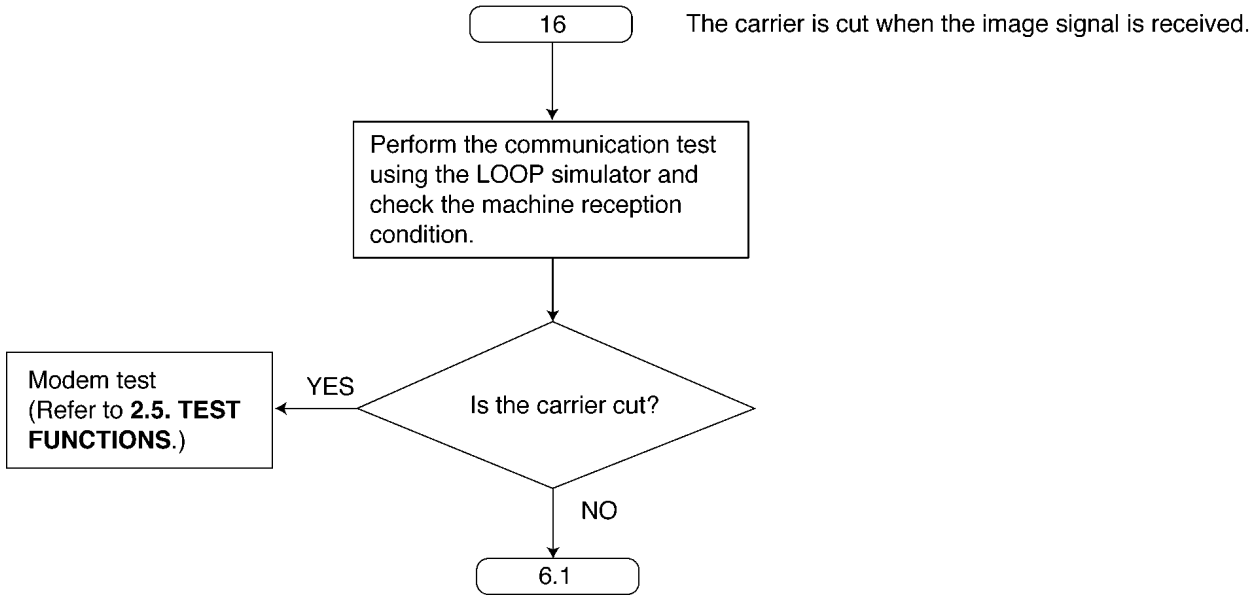

11
DCN is received after DIS transmission.
Confirm if a mechanical problem occurred. E.g., the caller interrupted the transmission.
Was it a mechanical error as mentioned above?
NO
YES
Have the caller transmit the data again.
Ask the service section for the caller's FAX machine to confirm the machine's condition.


12
300BPS error
Modem error
Check the modem peripheral's hardware.


13
DCN is received after FTT transmission.
There is no response at the other party after MCF or CFR is transmitted.
DCN is received after CFR transmission.
Confirm if a mechanical problem occurred. E.g., the caller interrupted the transmission.
Was it a mechanical error as mentioned above?
NO
YES
Ask the caller to transmit the data again.
6.1


14
DCN responds to the post message.
Confirm if a mechanical problem occurred. E.g., the receiver interrupted the reception.
Was it a mechanical error as mentioned above?
YES
NO
Perform voice communication with the NG receiver.
Ask the receiver to set the receiver's FAX machine to the receive mode and communicate again.
Check if the line was not interrupted by noises or cross talk. If not, wait until the line is able to perform correct communication.


15
Polling is not possible.
Confirm if a mechanical problem occurred. E.g., transmission was interrupted, the document was out of place, or on the receiving side (being polled).
Was it a mechanical error as mentioned above?
NO
YES
Ask the receiver to set the poll mode again and perform polling.
Ask the service section for the receiver's FAX machine to confirm the machine's condition.


16
The carrier is cut when the image signal is received.
Perform the communication test using the LOOP simulator and check the machine reception condition.
Is the carrier cut?
YES
Modem test
(Refer to **2.5. TEST FUNCTIONS**.)
NO
6.1

2.3.3.3.2. Remote programming

If, after the call is connected, the customer describes the situation and it is determined that the problem can be corrected by making parameter changes, this function makes it possible to change parameters such as the user code and service code from another fax (using DTMF tones). Therefore, travel to the customer´s location is not required. However, it is not possible to change all the parameters remotely (**2. Program mode table**). The function used to accomplish this is remote programming.

First, in order to check the current status of the service code parameter, print out the setup list (code: 991) and the service list (code: 999) from the customer´s fax machine.

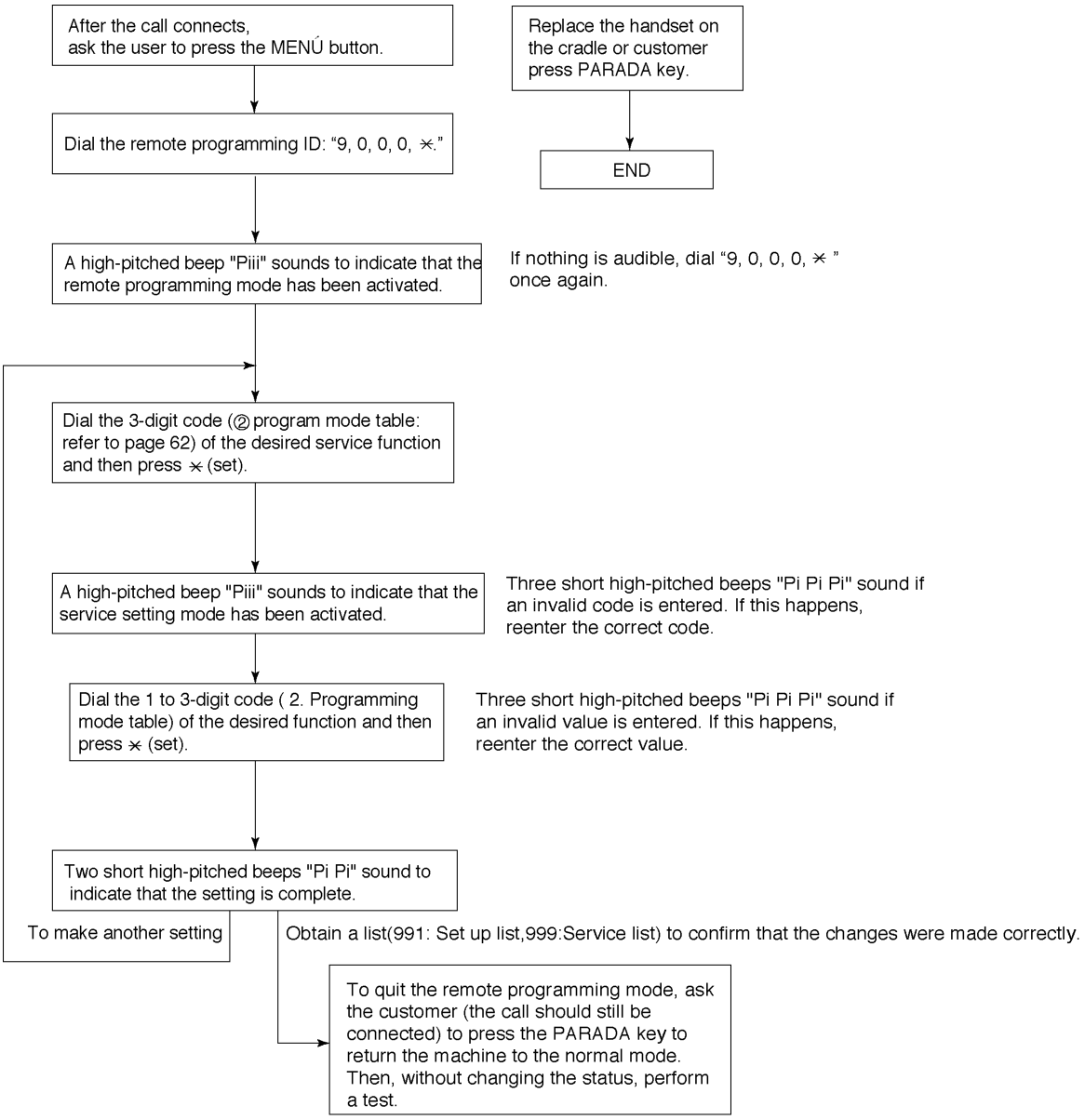
Based on these lists, the parameters for the desired codes can be changed.

The procedure for changing and listing parameters is described on **1. Entering the remote programming mode and changing service codes**. Also, before you quit the remote programming mode, it is advisable to obtain a new list to confirm that the changes were made correctly.

Hint:

Since the connected telephone is in use during the remote programming mode, it may be helpful to ask the customer to switch to the speakerphone. (Use a handset if a speakerphone is not available with your model.) This frees the customer from the need to remain right next to the fax while you are making parameter settings. When finished, inform the customer. Also note that in very noisy locations where the DTMF tones are not audible, the remote programming function will not work.

1. Entering the remote programming mode and changing service codes



2. **Program Mode Table**

Code	Function	Set Value	Default	Remote Setting
001	Set date and time	dd/mm/yy hh:mm	(01/Jan/99)	NG
002	Your logo	---------	---------	NG
003	Your telephone number	---------	(None)	NG
004	Transmission report mode	1:Error / 2:ON	ERROR	OK
006	FAX ring count	1~4	2	NG
	TAD/FAX ring count	1~4/TOLL SAVER/RINGER OFF	2	NG
	Not availabe in TEL/FAX	---------	VOX	NG
010	Recoudinng time	1~9 x 1 min, 0:VOX	4	OK
011	Remote ANS ID	---------	ID=111	NG
013	Dialing mode	1:PULSE / 2:TONE	TONE	OK
014	PC link (KX-FM330 ONRY)	1:ON / 2:OFF	ON	OK
015	Memory XMT	1:ON / 2:OFF	OFF	OK
022	Auto journal print	1:ON / 2:OFF	ON	OK
023	Overseas mode	ON / OFF	OFF	NG
025	Delayed transmission	ON / OFF	OFF	NG
026	Auto caller list	1:ON / 2:OFF	ON	OK
030	Silent FAX recognition ring	3 to 6 rings	3	OK
036	Rx reduction	1:92% / 2:86% / 3:72% / 4:100%	92%	OK
039	LCD contrast	1:NORMAL / 2:DARKER	NORMAL	OK
041	Remote FAX activation code	1:ON / 2:OFF	ON / ID=*9	NG
042	Message alert	1:ON / 2:OFF	OFF	OK
043	REC. time alert	1:ON / 2:OFF	OFF	OK
044	Receive alert	1:ON / 2:OFF	ON	OK
046	Friendly rcv.	1:ON / 2:OFF	ON	OK
047	Voice guidance	1:ON / 2:OFF	ON	OK
048	Language	1:GERMAN / 2:ENGLISH	GERMAN	OK
054	Common greeting MSG. REC. time	1:16s / 2:60s	16s	OK
060	Express mode	1:ON / 2:OFF	OFF	OK
061	Line mode	1:CO / 2:PBX	CO	OK
062	Recall mode	1:FLASH / 2:EARTH	FLASH	OK
063	Co access No.1	---------	(NONE)	NG
064	Co access No.2	---------	(NONE)	NG
065	Co access No.3	---------	(NONE)	NG
066	Co access No.4	---------	(NONE)	NG
067	Setting the ICM monitor	1:ON / 2:OFF	ON	OK
068	ECM Communication	1:ON / 2:OFF	ON	OK
071	Melody ringer	A / B / C	A	NG
076	FAX tone	1:ON / 2:OFF	ON	OK
077	Auto answer mode	1:TAM/FAX 2: FAX 3 : TEL/FAX	TAM/FAX	OK
078	TEL/FAX ring	1 to 9 rings	2	OK
079	Film detection	1:ON / 2:OFF	ON	OK
080	Set default	YES / NO	NO	NG
501	Pause time set	001~600 x 100msec	030	OK
502	Flash time set	01~99 x 10msec	80	OK
503	Dial speed	1:10pps / 2:20 pps	10	OK
511	Vox sense	1:HIGH / 2:LOW	HIGH	OK
520	CED frequency select	1:2100Hz / 2:1100Hz	2100	OK
521	International mode select	1:ON / 2:OFF	OFF	OK
522	Auto standby select	1:ON / 2:OFF	ON	OK
523	Receive equalizer select	1:0.0km / 2:1.8km / 3:3.6km / 4:7.2km	0km	OK
524	Transmission egualizer select	1:0.0km / 2:1.8km / 3:3.6km / 4:7.2km	0km	OK
546	Flash time (CO)	01~99	200 msec	OK
550	Memory clear	---------	---------	NG
551	ROM check	---------	---------	NG
552	DTMF signal tone test	1:ON / 2:OFF	OFF	NG
553	Monitor on FAX communication select	1:OFF / 2:Phase B / 3:ALL	OFF	OK
554	Modem test	---------	---------	NG
555	Scanner test	---------	---------	NG
556	Motor test	---------	---------	NG
557	LED test	---------	---------	NG
558	LCD test	---------	---------	NG
559	Document jam detection select	1:ON / 2:OFF	ON	OK
561	Key test	---------	---------	NG
570	Break % select	1:61% / 2:67%	61%	NG

Code	Function	Set Value	Default	Remote Setting
571	ITS auto redial time set	00~99	11	OK
572	ITS auto redial line disconnection time set	001~999	060	OK
573	Remote turn-on ring number set	01~99	10	OK
580	TAM continuous tone detection	1:ON / 2:OFF	ON	OK
590	FAX auto redial time set	00~99	11	OK
591	FAX auto redial line disconnection time set	001~999	060	OK
592	CNG transmit select	1:OFF / 2:ALL / 3:AUTO	ALL	OK
593	Time between CED and 300 bps	1:75ms / 2:500ms / 3:1sec	75ms	OK
594	Overseas DIS detection select	1:1st / 2:2nd	1st	OK
595	Receive error limit value set	1:5% / 2:10% / 3:15% / 4:20%	10%	OK
596	Transmit level set	-15~00dBm	-10	OK
598	Receiving Sensitivity	-20~48dBm	-44	OK
624	AT ring time out	1:3sec 2:5sec	3sec	OK
717	Transmit speed select	1:14400 / 2:12000 / 3:9600 / 4:7200 / 5:4800 / 6:2400	14400bps	OK
718	Receive speed select	1:14400 / 2:12000 / 3:9600 / 4:7200 / 5:4800 / 6:2400	14400bps	OK
719	Ringer off in TEL/FAX mode	1:ON / 2:OFF	ON	OK
721	Pouse tone detect	1:ON / 2:OFF	OFF	OK
722	Redial tone detect	1:ON / 2:OFF	ON	OK
724	PC-FAX ATD BUSY TONE DETECT	1:ON / 2:OFF	ON	OK
745	Power ON film feed	1:ON / 2:OFF	ON	OK
763	CNG detect time for friendly reception	1:10s / 2:20s / 3:30s	30s	OK
771	T1 timer	1:35s / 2:60s	35s	OK
775	Monitoring of message transfer	1:ON / 2:OFF	OFF	OK
815	Sensor & VOX test	---------	---------	NG
852	Print test pattern	---------	---------	NG
853	Top margin	1~9	---------	OK
854	Left margin	1~8	---------	OK
861	A4 size set	1:ON / 2:OFF	ON	OK
880	Special service journal	1:Start	---------	OK
890	TEL/FAX ring back tone	1:ON / 2:OFF	ON	OK
895	TEL/FAX Receive mode	1:TAD/FAX / 2:FAX	FAX	OK
991	Setup list	1:Start	---------	OK
994	Journal list	1:Start	---------	OK
999	Service list	1:Start	---------	OK

OK means "can set".

NG means "can not set".

Note:

Refer to **2.4.4. SERVICE FUNCTION TABLE** for descriptions of the individual codes.

Example:

If you want to set value in the "004 Transmission report mode", press the dial key number 1, 2 or 3 corresponding to the Set Value you want to select. (1:ERROR/2:ON/3:OFF)

2.3.3.4. Digital Board Section

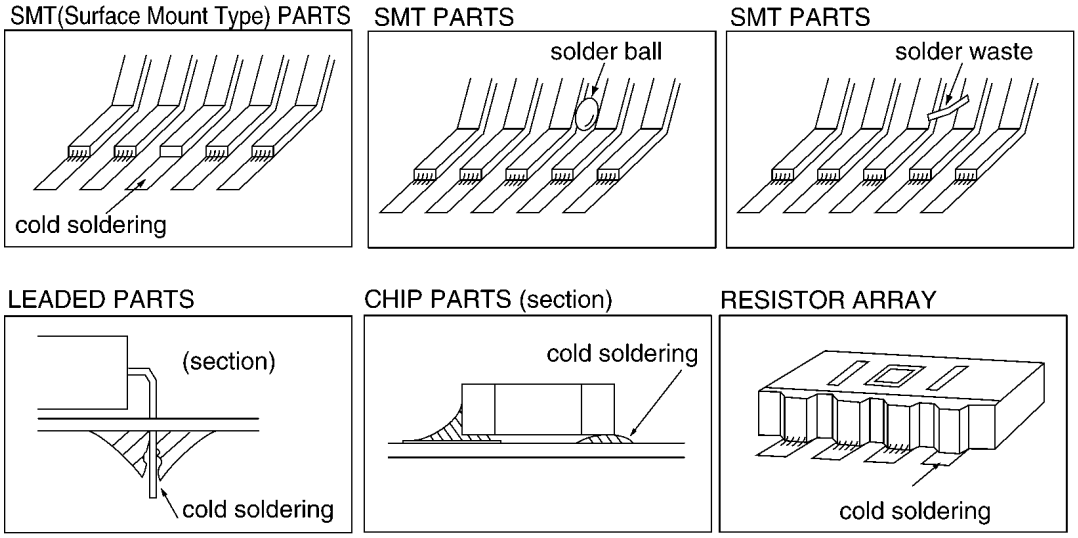
When the unit fails to boot up the system, take the troubleshooting procedures very carefully. It may have a serious problem.

The symptom: No response when the power is turned on. (No LCD display, and keys are not accepted.)

The first step is to check the power source. If there is no problem with the power supply unit, the problem may lie in the digital unit (main board).

As there are many potential causes in this case (ASIC, DRAM, etc.), it may be difficult to specify what you should check first. If a mistake is made in the order of checks, a normal part may be determined faulty, wasting both time and money.

Although the tendency is to regard the problem as a serious one (IC malfunction, etc.), usually most cases are caused by solder faults (poor contact due to a tunnel in the solder, signal short circuit due to solder waste).



Note:

1. Electrical continuity may have existed at the factory check, but a faulty contact occurred as a result of vibration, etc., during transport.
2. Solder waste remaining on the board may get caught under the IC during transport, causing a short circuit.

Before we begin mass production, several hundred trial units are produced at the plant, various tests are applied and any malfunctions are analyzed. (In past experiences, digital IC (especially SRAM, DRAM and ROM) malfunctions are extremely rare after installation in the product.)

This may be repaired by replacing the IC, (DRAM etc.). However, the real cause may not have been an IC malfunction but a soldering fault instead.

Soldering faults difficult to detect with the naked eye are common, particularly for ASIC and RA (Resistor Array). But if you have an oscilloscope, you can easily determine the problem site or IC malfunction by checking the main signal lines.

Even if you don´t have such a measuring instrument, by checking each main signal line and resoldering it, in many cases the problem will be resolved.

An explanation of the main signals (for booting up the unit) is presented below.

> Don't replace ICs or stop repairing until checking the signal lines.
> An IC malfunction rarely occurs. (By understanding the necessary signals for booting up the unit, the "Not Boot up" display is not a serious problem.)

What are the main signals for booting up the unit?

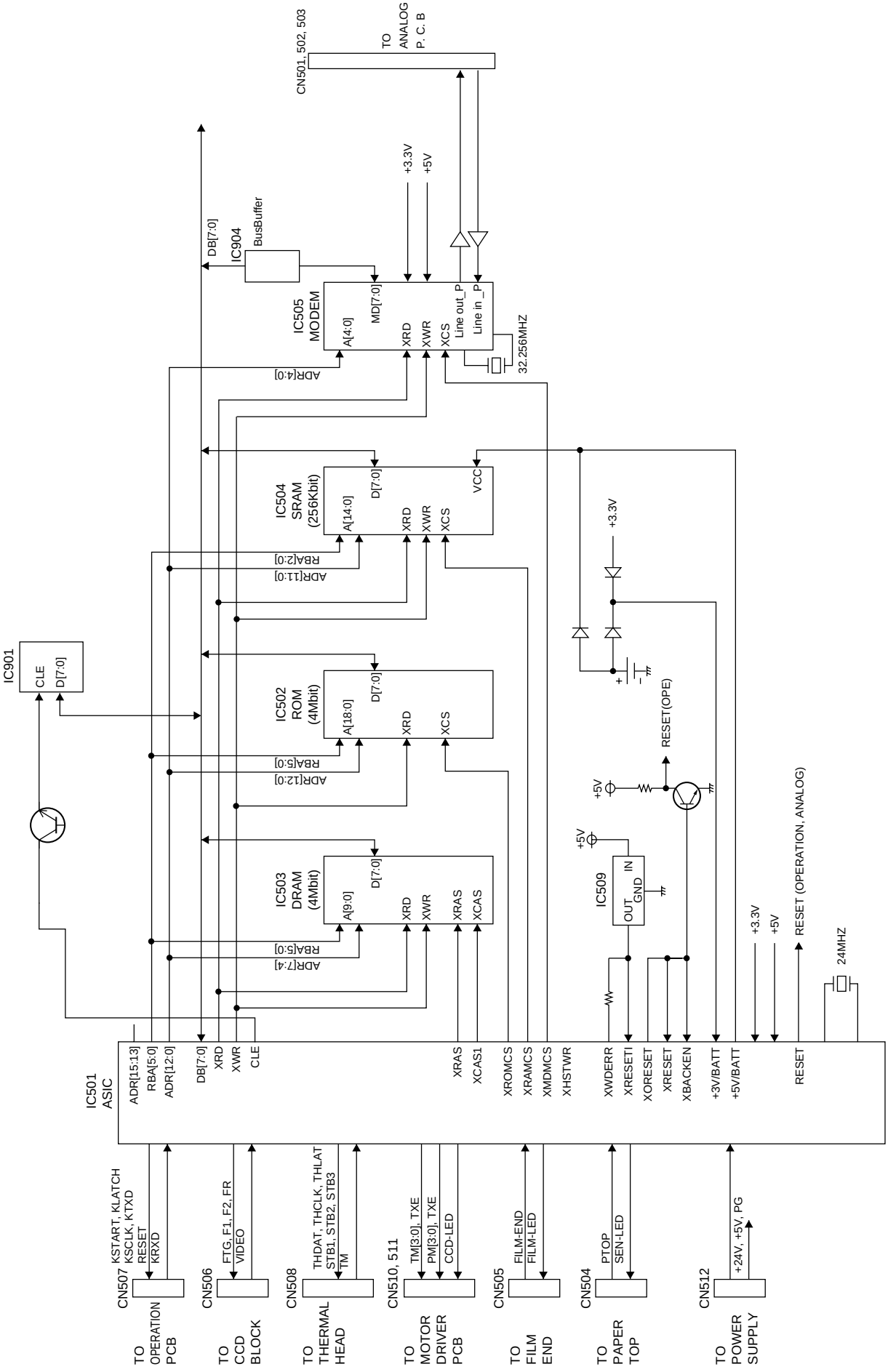
Please refer to **2.3.3.4.1. Digital Block Diagram**.

The ASIC (IC501) controls all the other digital ICs. When the power is turned on, the ASIC retrieves the operation code stored in the ROM (IC502), then follows the instructions for controlling each IC. All ICs have some inner registers that are assigned to a certain address.

It is the address bus by which the ASIC designates the location inside each IC. And the data bus reads or writes the data in order to transmit the instructions from the ASIC to the ICs.

These signal lines are all controlled by voltages of 5V (H) or 0V (L).

2.3.3.4.1. Digital Block Diagram



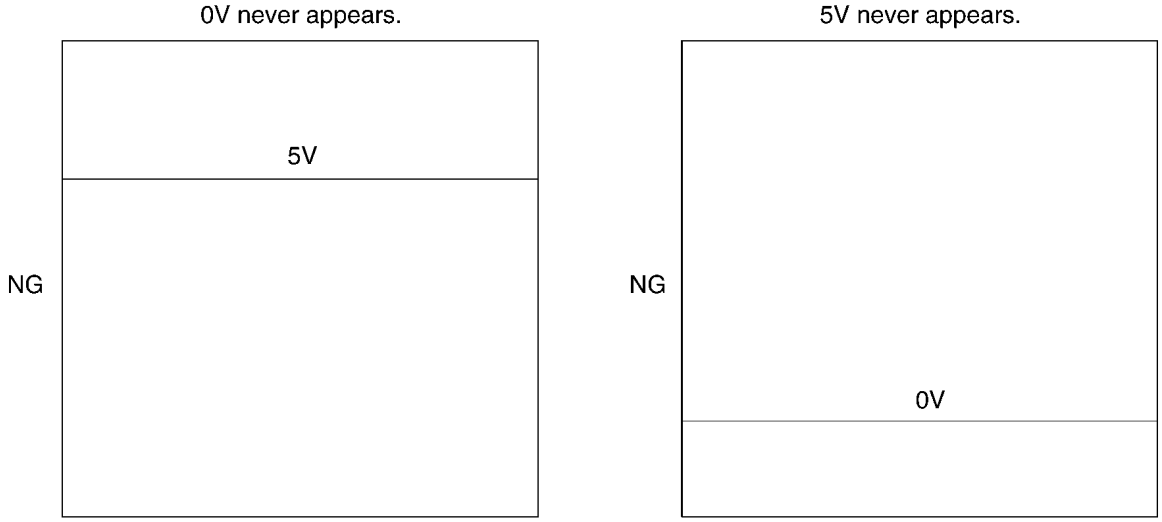
You also need to check the signal lines listed here [List 1] when the unit fails to boot up the system. Those signal lines should remain normal. Other signal lines are not directly related to that failure even if they have faults or troubles.

[List 1]

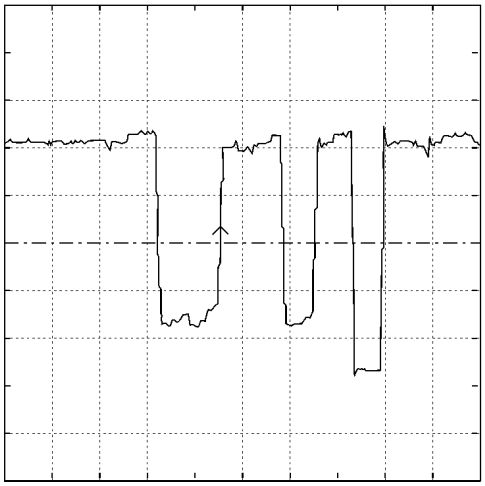
①	D0～D7	(Data Bus)
②	ALE	(Address Latch Enable)
③	A0～A12	(Address Bus)
④	$\overline{RD}$	(Read Signal)
⑤	$\overline{ROMCS}$	(ROM Select Signal)
	$\overline{WR}$	(Write Signal)
⑥	$\overline{RAMCS}$	(SRAM Select Signal)
	RBA0～RBA5	(Bank Address Signal)
⑦	$\overline{RAS}$	(DRAM Row Address Strobe Signal)
	$\overline{CAS}$	(DRAM Column Address Strobe Signal)
	$\overline{MDMCS}$	(Modem Select Signal)
	MDB0～7	(Modem Data Bus)

As long as these signals remain normal, once the power is turned on, each IC can repeatedly output 5V (H) and 0V (L). The following shows NG and normal wave patterns.

NG Wave pattern (Refer to NG EXAMPLE)

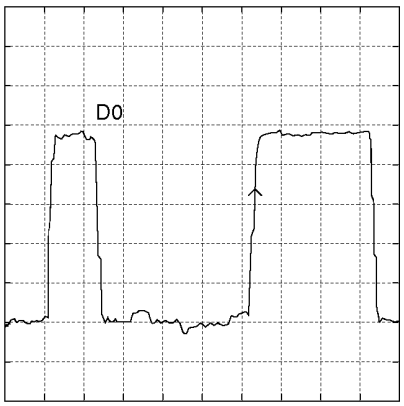


Short between D0 and D1
500ns/div, 1V/div



Normal Wave Patterns

① D0~D7 200ns/div, 1V/div

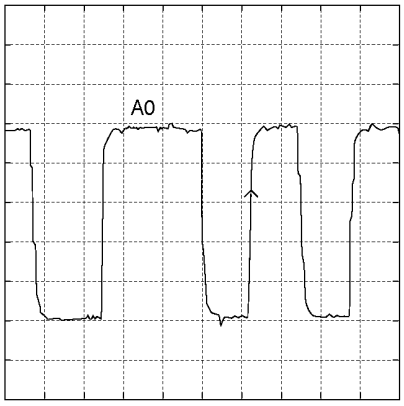


② ALE 100ns/div, 1V/div

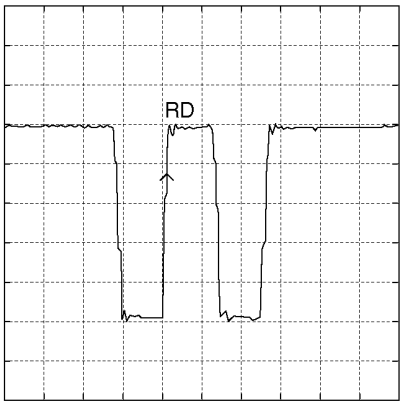
OK



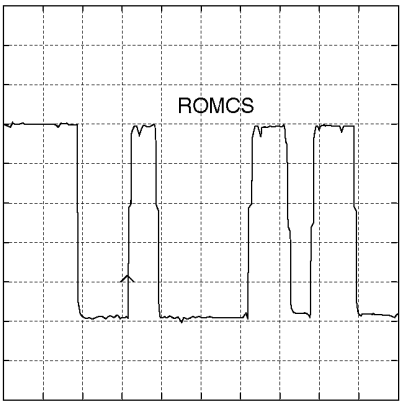
③ A0~A5 200ns/div, 1V/div



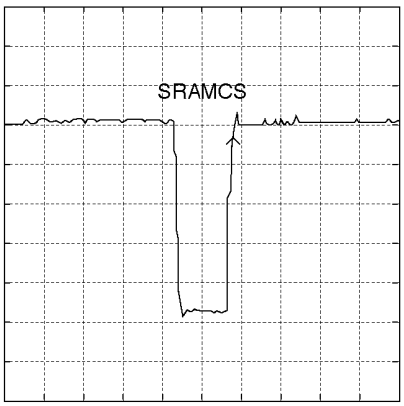
④ $\overline{RD}$ 100ns/div, 1V/div



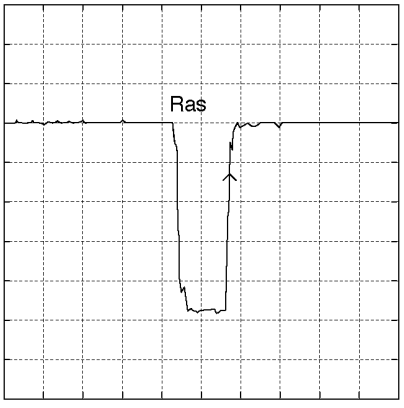
⑤ $\overline{ROMCS}$ 500ns/div, 1V/div



⑥ $\overline{RAMCS}$ 500ns/div, 1V/div



⑦ $\overline{RAS}$, $\overline{CAS}$ 100ns/div, 1V/div



Remarks:

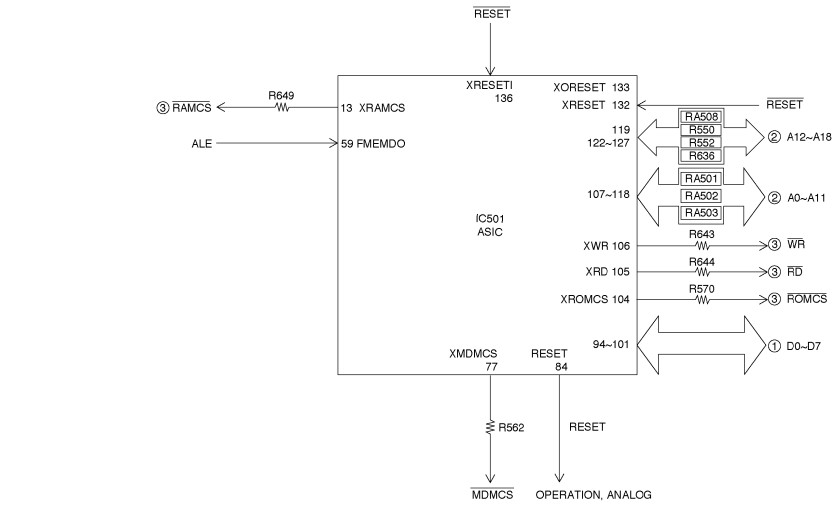
When you use an oscilloscope to judge whether a signal to be tested is normal or NG, perform the signal check in exactly the same order as in [List 1]. (If the ASIC fails to access the ROM, the ASIC cannot access SRAM or DRAM normally.)

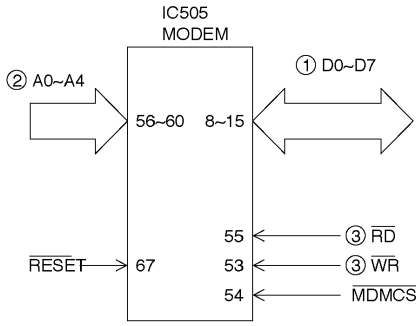
The digital circuit actually operates according to the timing combinations of these signals. If the timing of these signals is even slightly delayed, the circuit will not work. Nor will it if the IC is defective and the output voltage level is not normal although the timing of these signals is accurate enough to meet the specifications. (Make sure that your oscilloscope is calibrated before starting a test.)

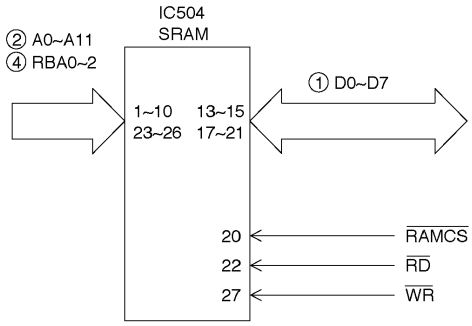
Therefore, it is imperative to confirm whether each IC outputs the signal at the correct level. (See the **I/O Pin No. Diagram.**) The signal level should be constantly output at between 5V (H) and 0V (L) as described earlier.

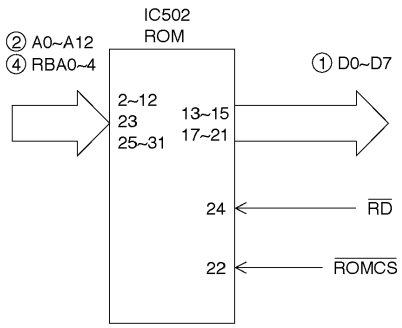
Note:

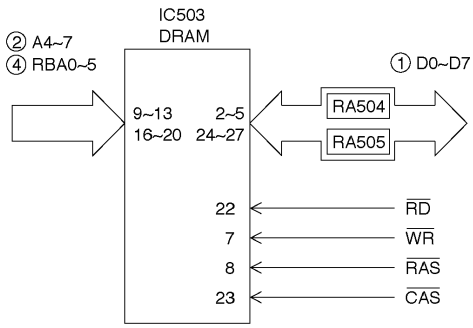
Simply check the output level and make sure if the IC repeatedly outputs the signal at between 5V (H) and 0V (L).

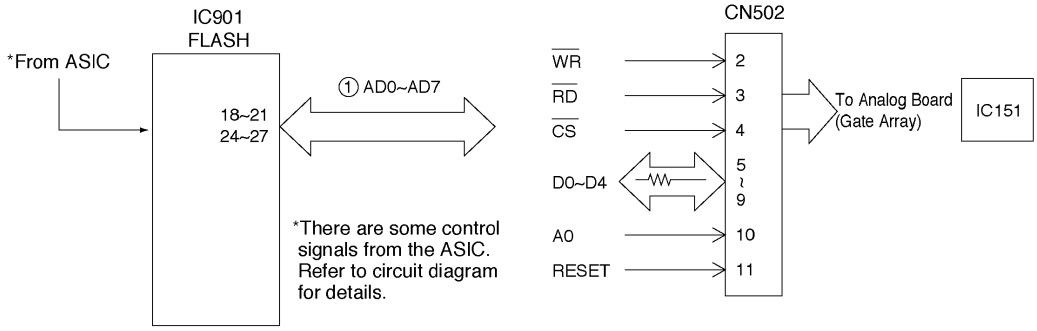

RESET
XRESETI 136
XORESET 133
XRESET 132
RESET
③ RAMCS
R649
13 XRAMCS
ALE
59 FMEMDO
RA508
R550
R552
R636
119
122~127
② A12~A18
RA501
RA502
RA503
107~118
② A0~A11
IC501
ASIC
XWR 106
R643
③ WR
XRD 105
R644
③ RD
XROMCS 104
R570
③ ROMCS
94~101
① D0~D7
XMDMCS 77
RESET 84
R562
RESET
MDMCS
OPERATION, ANALOG


IC505
MODEM
② A0~A4
① D0~D7
56~60
8~15
55
③ RD
RESET
67
53
③ WR
54
MDMCS

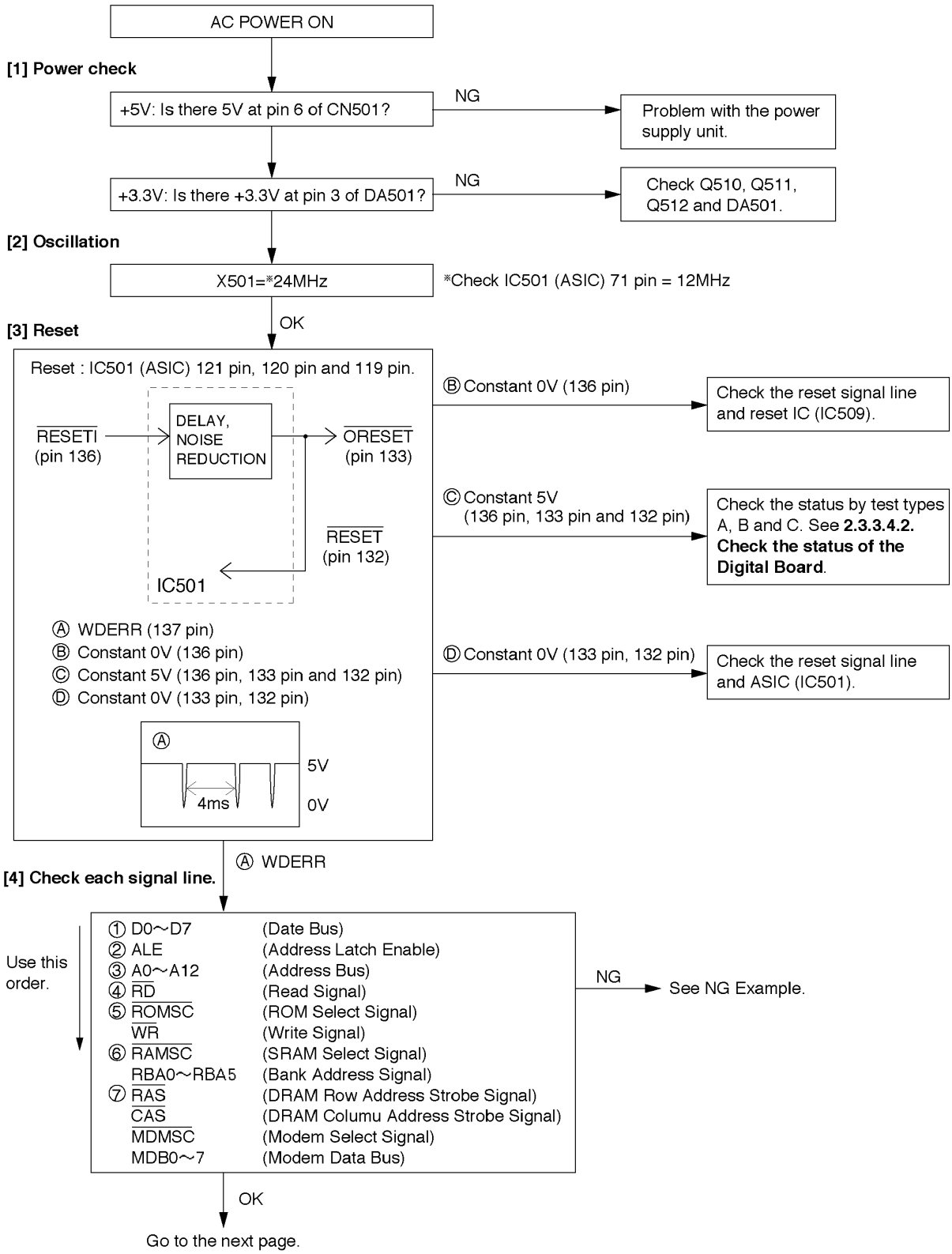

IC504
SRAM
② A0~A11
④ RBA0~2
① D0~D7
1~10
23~26
13~15
17~21
20
RAMCS
22
RD
27
WR

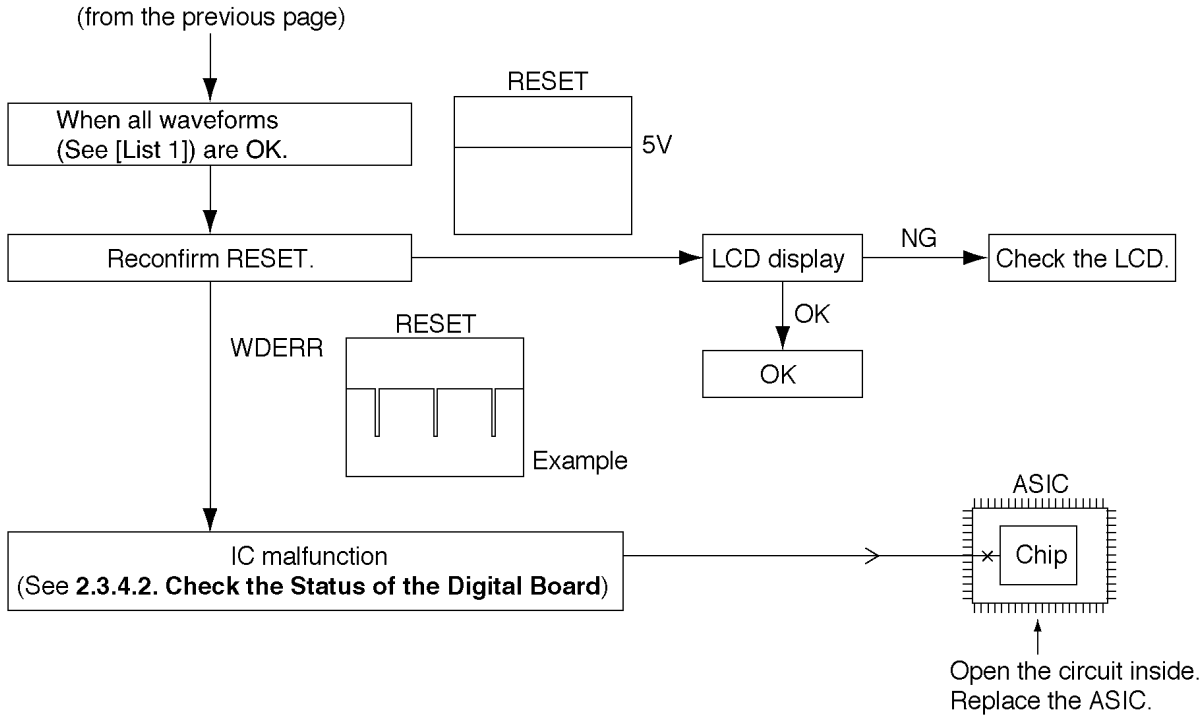

IC502
ROM
② A0~A12
④ RBA0~4
① D0~D7
2~12
23
25~31
13~15
17~21
24
RD
22
ROMCS


IC503
DRAM
② A4~7
④ RBA0~5
① D0~D7
9~13
16~20
2~5
24~27
RA504
RA505
22
RD
7
WR
8
RAS
23
CAS

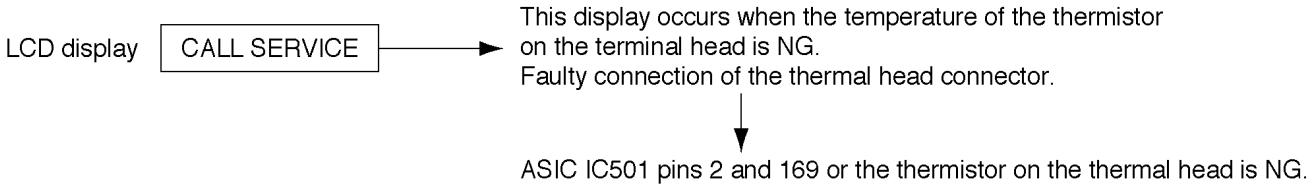

IC901
FLASH
*From ASIC
① AD0~AD7
18~21
24~27
*There are some control signals from the ASIC. Refer to circuit diagram for details.
CN502
WR
2
RD
3
CS
4
D0~D4
5
~
9
A0
10
RESET
11
To Analog Board (Gate Array)
IC151

After the power is turned on, the ASIC initializes and checks each IC.
The ROM, SRAM, and modem are checked.
If initialization fails for the ICs , the system will not boot up.
In this case, please find the cause as follows.



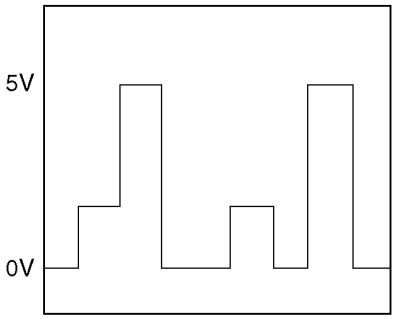


Other NG examples while the power is ON and the LCD displays the following.

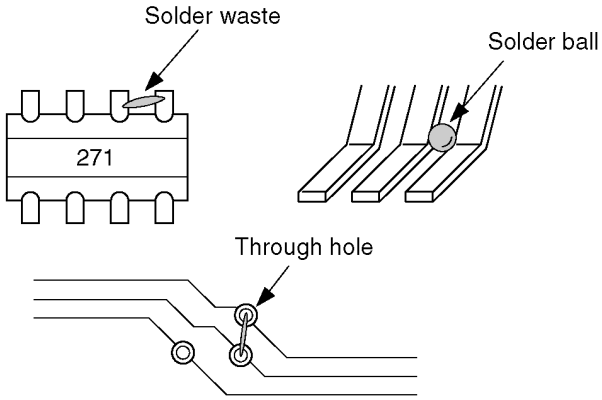


NG Example

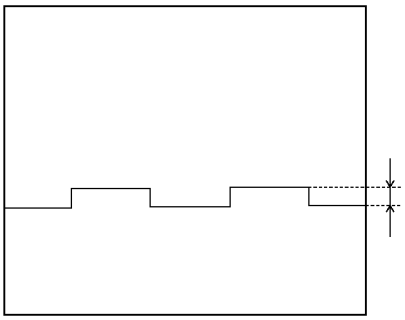
1.



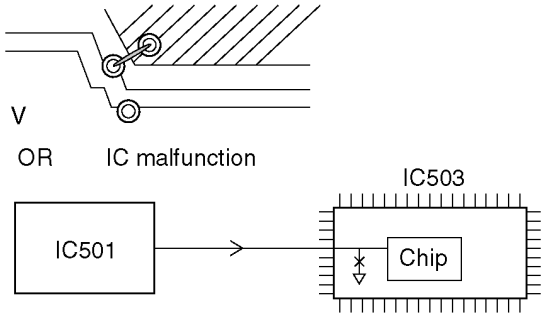
Short circuit from the adjacent signal wires.
Check for a short circuit in the RA and IC leads and the signal wire at the through hole.



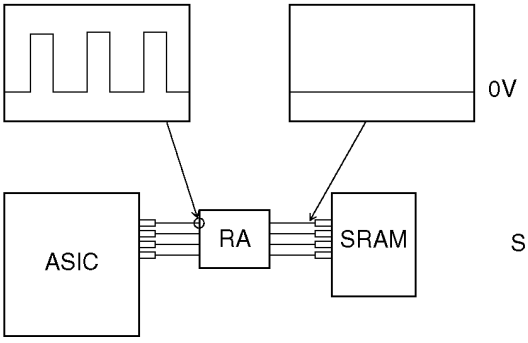
2.



Short between the signal line and GND.



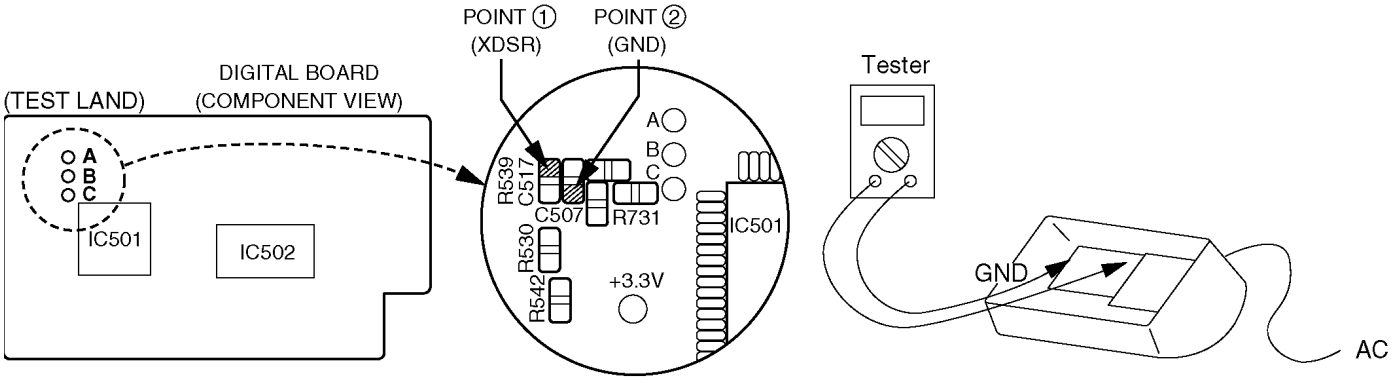
3.



Solder fault on RA.

2.3.3.4.2. Check the Status of the Digital Board

Please check the status (voltage) of test lands **A**, **B** and **C**.
These statuses may tell you a defective point.



- Turn off the power supply.
- Short using a metallic object, such as tweezers, between the **POINT ①** and **POINT ② (GND)** land, and turn on the AC power for few seconds. And then remove a metallic object.
- Check the following voltages using an oscilloscope or tester.
- To cancel the status check mode, turn off the AC power.

Defective point	Check point voltage			Check items
	A	B	C	
RTC (IC501)	5V	0V	0V	IC501(RTC is included in IC501)
DRAM (IC503)	5V	5V	0V	IC503(8,23 pin), R568, R569, RA504, RA505, L525, IC501(88,89 pin)
MODEM (IC505)	0V	0V	5V	IC501(28 pin), IC505(53~55 pin), L523, R575, C571, R614, R562, RA506, RA507
ALL OK	5V	5V	5V	

- This indicates that the Add/Data Bus, RAM, ROM, MODEM, and ASIC are all connected to the ASIC properly and that control from the ASIC is possible.

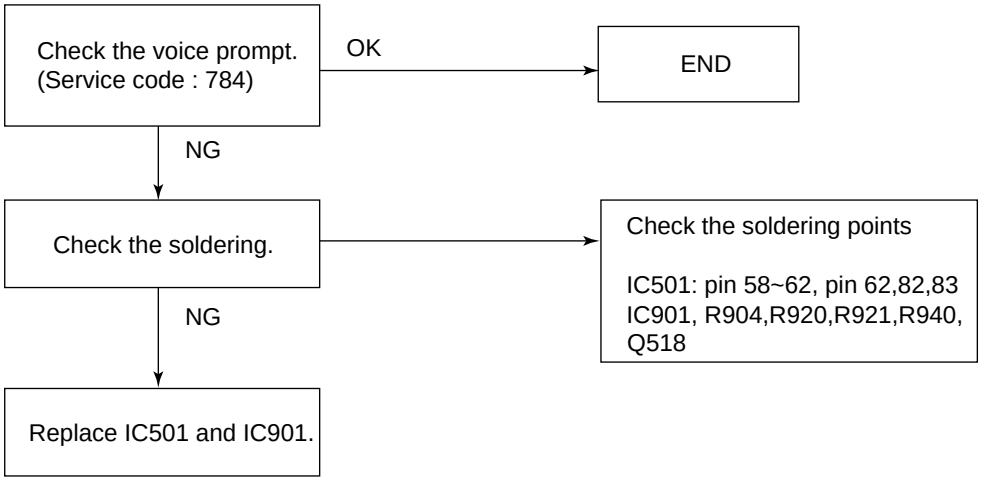
Please check the soldering and conduction of these components.
If there is no problem, replace the ICs.

If you still have a problem with the digital board, please refer to **NG wave pattern**.

¥To cancel the status check mode, turn off the AC power.

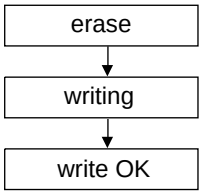
FLASH MEMORY (IC901)

If the unit is working correctly but the VOICE GUIDANCE (voice prompt) is not heard, you should check the Flash Memory.



A voice message is pre-recorded in the Flash Memory (IC901). So, when you find an IC901 malfunction and exchange it with a new one. You have to pre-record the voice message by using a Voice Prompt IC (See **14.8. FIXTURES AND TOOLS.**).
How to use the Voice Prompt IC.

1. Turn the AC power OFF.
2. Exchange the regular system ROM with the special ROM.
3. Turn the AC power ON.
4. The Voice Message Recording starts automatically.
   LCD changes



5. Turn the AC power OFF.
6. Exchange the special ROM with the regular system ROM.

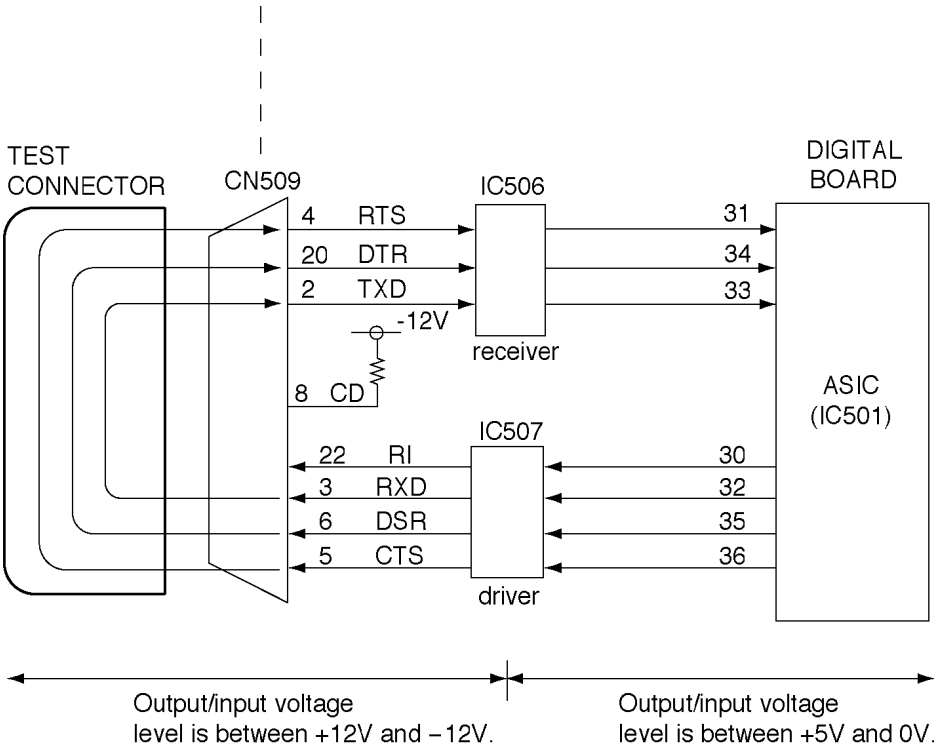
2.3.3.4.3. RS-232C serial communication (KX-FM330 Only)

This model has a communication port designed for RS-232C serial communication. (The EIA Standards specify the interface cable type (No. RS232C) and the voltage levels.

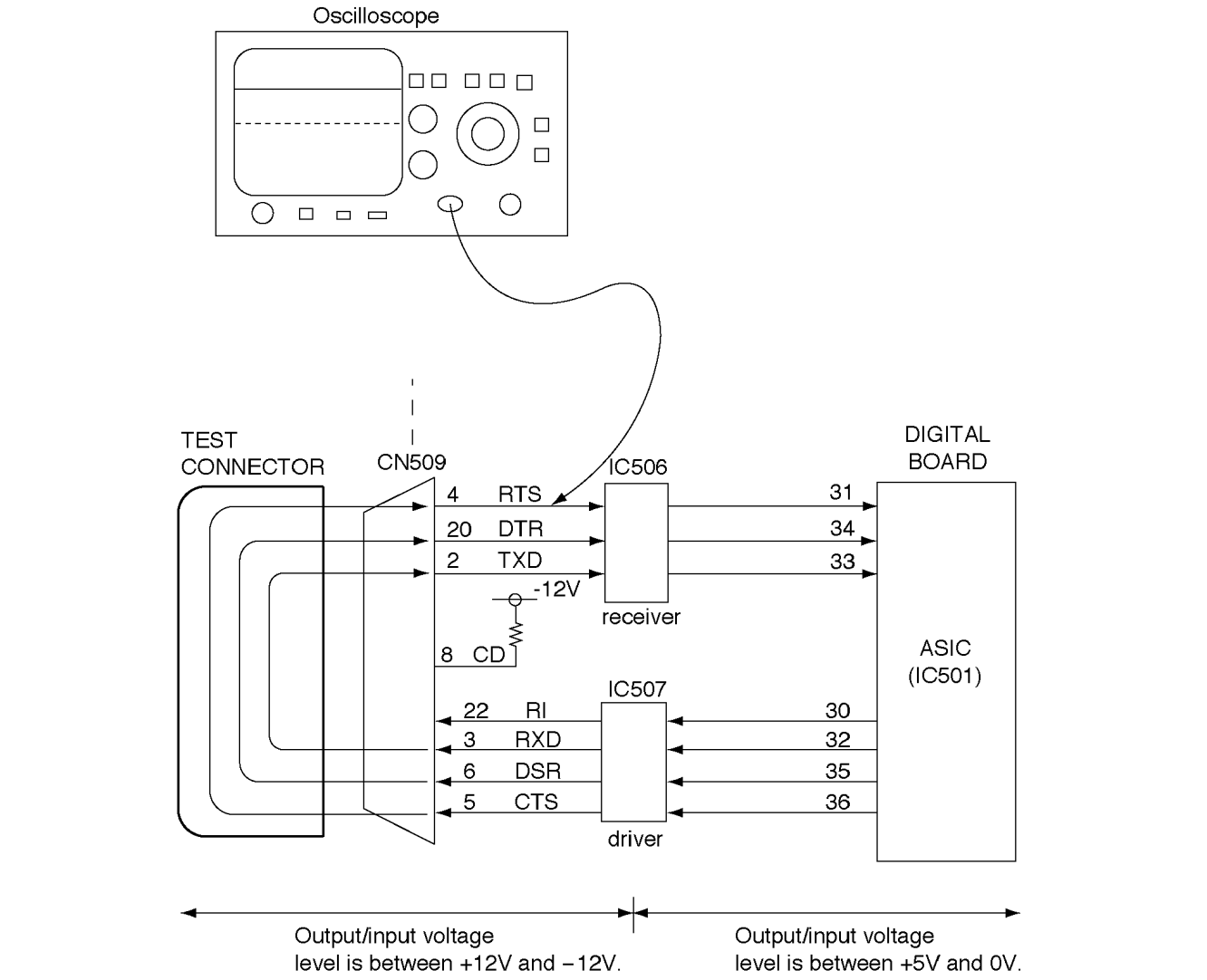
If you use the TEST CONNECTOR, you can easily check the communication port without a PC. The connector should be wired so that the output signal can return to the input port. (The transmitted data is received by the unit.) You do not need to do any difficult operations. You can get a test result by a simple key operation (#9000 ✳870).

The result (OK or NG) is displayed on LCD.

Displayed "NG 1" means that DTR, DSR, RTS, CTS is not good.
Displayed "NG 2" means that communication data error (TXD, RXD) occurred.







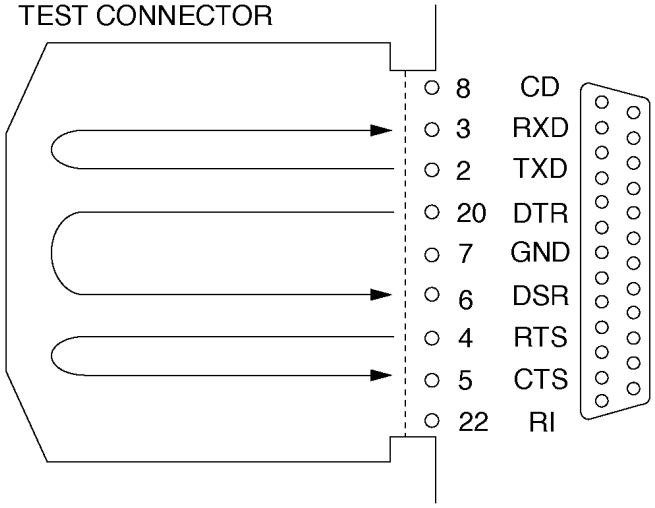


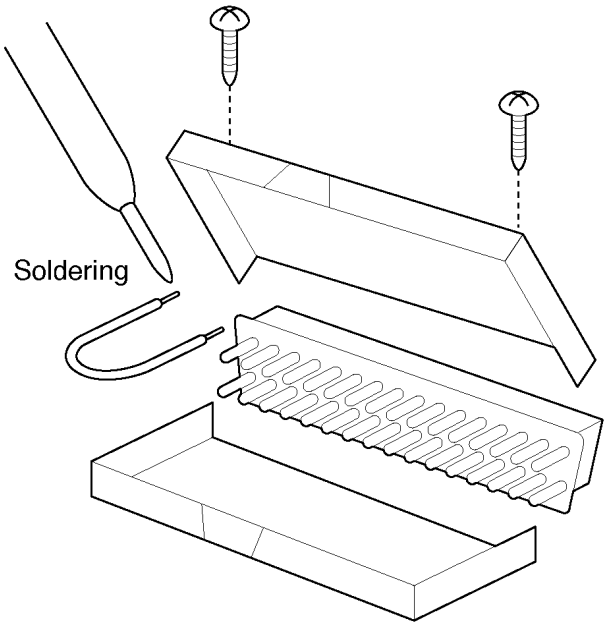
The electric circuit for this RS-232C port is simple. It is logically controlled by ASIC IC501, driver IC507 and receiver IC506.

Check voltage while testing the RS-232C cable.
If the voltage level of signal at IC501, IC506 and IC507 is not 0V~5V, replace IC501.
If the voltage level of signal at IC509 is not -15V~+15V, replace IC506 and IC507.

This TEST CONNECTOR is provided as an option.

Or you can get a connector available on the market and make the TEST CONNECTOR as shown below.





Connection

Wire the lead from **Pin 2** to **3.**
Wire the lead from **Pin 4** to **5.**
Wire the lead from **Pin 20** to **6.**

2.3.3.5. Analog Board Section

This chapter provides the testing procedures required for the analog parts. A signal route to be tested is determined depending upon purposes. For example, the handset TX route begins at the handset microphone and the signal is output to the telephone line. The signal mainly flowing on this route is analog. You can trace the signal with an oscilloscope. The signal flow on each route is shown in the Check Sheet here. If you find a specific problem in the unit, for example if you cannot communicate with the H/S, trace that signal route locally with the following Check Sheet and locate the faulty point.

CHECK SHEET

(SYMPTOM) ITEMS TO CHECK	Signal IN → ROUTE → OUT
SP-PHONE Tx	MIC-R110-C79-IC5(51-71)-C145-CN7(7)-{CN501(7)-R707-R913-C930-IC505(36-69)-C941-C805-R806-IC803(2-1)-C942-CN501(10)}-CN7(10)-C126-R159-IC5(73-63)-C53-R73-IC10(2-1)-C37-R58-R57-T1-TEL LINE
SP-PHONE Rx	TEL LINE-T1-R59-C44-IC10(6-7)-LPF(C54-IC11-IC12)-C56-C59-R85-R89-C64-IC2(1-2)-C68-CN7(9)-{CN501(9)-C701-IC801(3-4)-C943-J604-C603-IC505(60-47)-C925-R912-R708-CN501(8)}-CN7(8)-C127-R160-IC5(75-41)-C100-R139-IC5(40-38)-C91-R132-IC3(4-5,8)-SPEAKER
Handset Tx	MIC-L35-R135-C94-IC5(52,54-63)-C53-R73-IC10(2-1)-C37-R58-R57-T1-TEL LINE L38-R134-C93
Handset Rx	TEL LINE -T1-R59-C44-IC10(6-7)-LPF (C54-IC11-IC12)-C56-C57-R80-R150-C113-IC5(59-45,56)
Greeting for TEL LINE MSGS for TEL LINE	C84-L37-SPEAKER L36
DTMF monitor – Speaker	{IC505(47)-C925-R912-R708-CN501(8)}-CN7(8)-C127-R160-IC5(75-41)-C100-R139-IC5(40-38)-C91-R132-IC3(4-5,8)-Speaker
DTMF monitor – Handset	{IC505(69)-C941-C805-R806-IC803(2-1)-C942-CN501(10)}-CN7(10)-C126-R155-IC5(76-45,46)
Greeting for TEL LINE MSGS for TEL LINE	C84-L37-Speaker L36
DTMF for TEL LINE FAX Tx	{IC505(69)-C941-C805-R806-IC803(2-1)-C942-CN501(10)}-CN7(10)-C126-R159-IC5(73-63)-C53-R73-IC10(2-1)-C37-R58-R57-T1-TEL LINE
(TONE 1) Dummy Ring Back tone and TAM Beep to Line	{IC501(38)-R567-R573-C564-CN501(11)}-CN7(11)-R161-C119-IC5(77-63)-C53-R73-IC10(2-1)-C37-R58-R57-T1-TEL LINE
(TONE 1) RINGING Alarm / Beep / Key tone	{IC501(38)-R567-R573-C564-CN501(11)}-CN7(11)-R161-C119-IC5(77-41)-C100-R139-IC5(40-38)-C91-R132-IC3(4-5,8)-SPEAKER
FAX Rx ICM Rec	TEL LINE-T1-R59-C44-IC10(6-7)-LPF (C54-IC11-IC12)-C56-C59-R85-R89-C64-IC2(1-2)-C68-CN7(9)-{CN501(9)-C701-IC801(3-4)-C943-J604-C603-IC505(60)}
CNG / DTMF (OFF Hook) VOX DETECTION FAX Rx	TEL LINE-T1-R59-C44-IC10(6-7)-LPF(C54-IC11-IC12)-C56-C59-R85-R89-C64-IC2(1-2)-C68-CN7(9)-{CN501(9)-C701-IC801(3-4)-C943-J604-C603-IC505-(60)}
Greeting / MEMO Rec	MIC-R110-C79-IC5(51-71)-C145-CN7(7)-{CN501(7)-R707-R913-C930-IC505(36)
Caller ID DTMF detection (ON Hook)	TEL LINE-T2-C115-R154-IC5(61-67)-R167-C134-IC2(10-11)-C68-CN7(9)-{CN501(9)-C701-IC801(1-2)-J606-C807-R808-IC803(6-7)-C948-IC801(11-10)-J604-C603-IC505(60)}

Note:

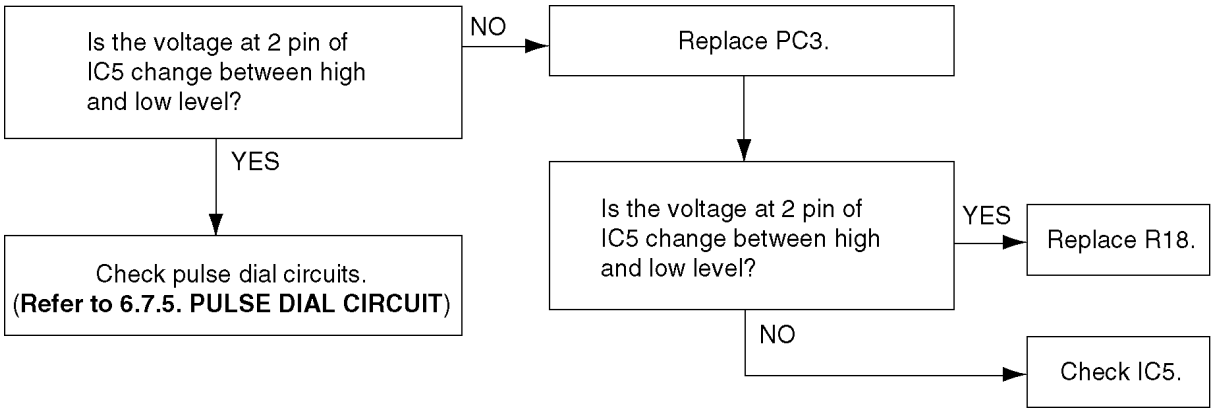
{ }: digital board

1. **Defective ITS (Integrated Telephone System) Section**

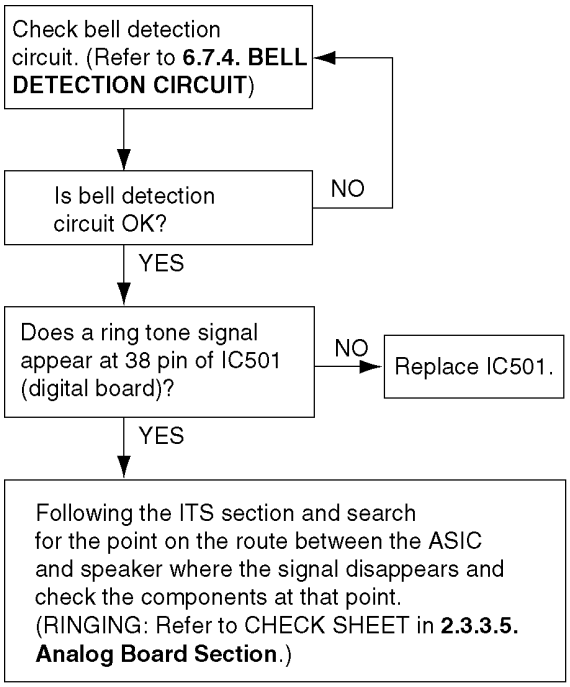
a. **No handset and speakerphone transmission / reception**

Following the ITS section or the NCU section, search for the route between the handset microphone and telephone line (sending), or between the telephone line and the handset speaker (receiving), or between the telephone line and the speaker (receiving) where the signal disappears.
Check the components at that point. CHECK SHEET in **2.3.3.5. Analog Board Section** is useful for this investigation.

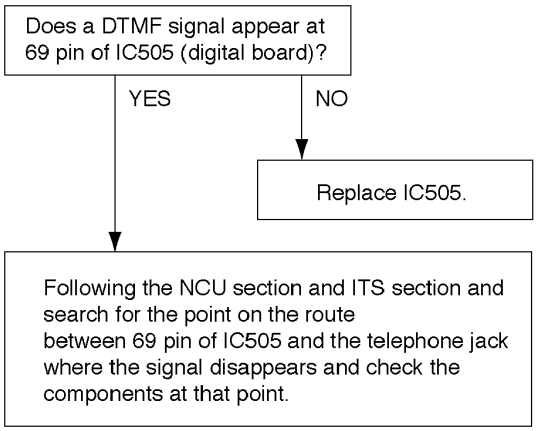
b. **No pulse dialing**



c. **No ring tone**



d. **No tone dialing**



2.3.3.5.1. Digital Speakerphone

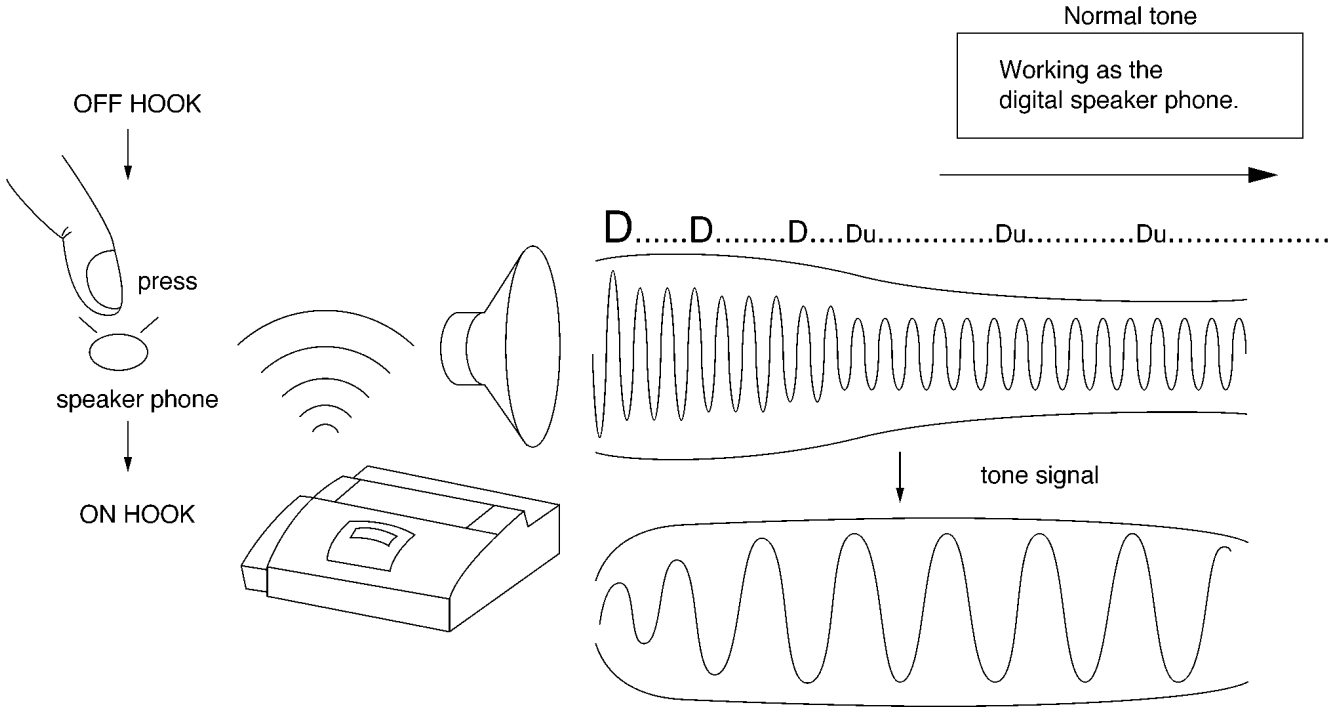
The digital speakerphone has different features from the analog speakerphone.

The analog speakerphone switches between Tx or Rx. Either Tx or Rx is able to pass through a telephone line or speaker, depending on the Tx and Rx signal (voice) level. The higher-level signal (either TX or RX) can pass through the route.

Therefore, you never hear the other party´s voice while you are talking. However, the digital speakerphone allows you to hear the other party´s voice while you are talking. So both Tx and Rx are active at the same time. There is also a defference in the troubleshooting procedures between the two types.

At the start of communication, during the initial 2~3 correspondences, the digital speakerphone performs half-duplex operation, alternating between transmission (Tx) and reception (Rx). Then duplex communication becomes available.

Learning occurs during the initial 2~3 correspondences in order to set the appropriate parameters for duplex communication.

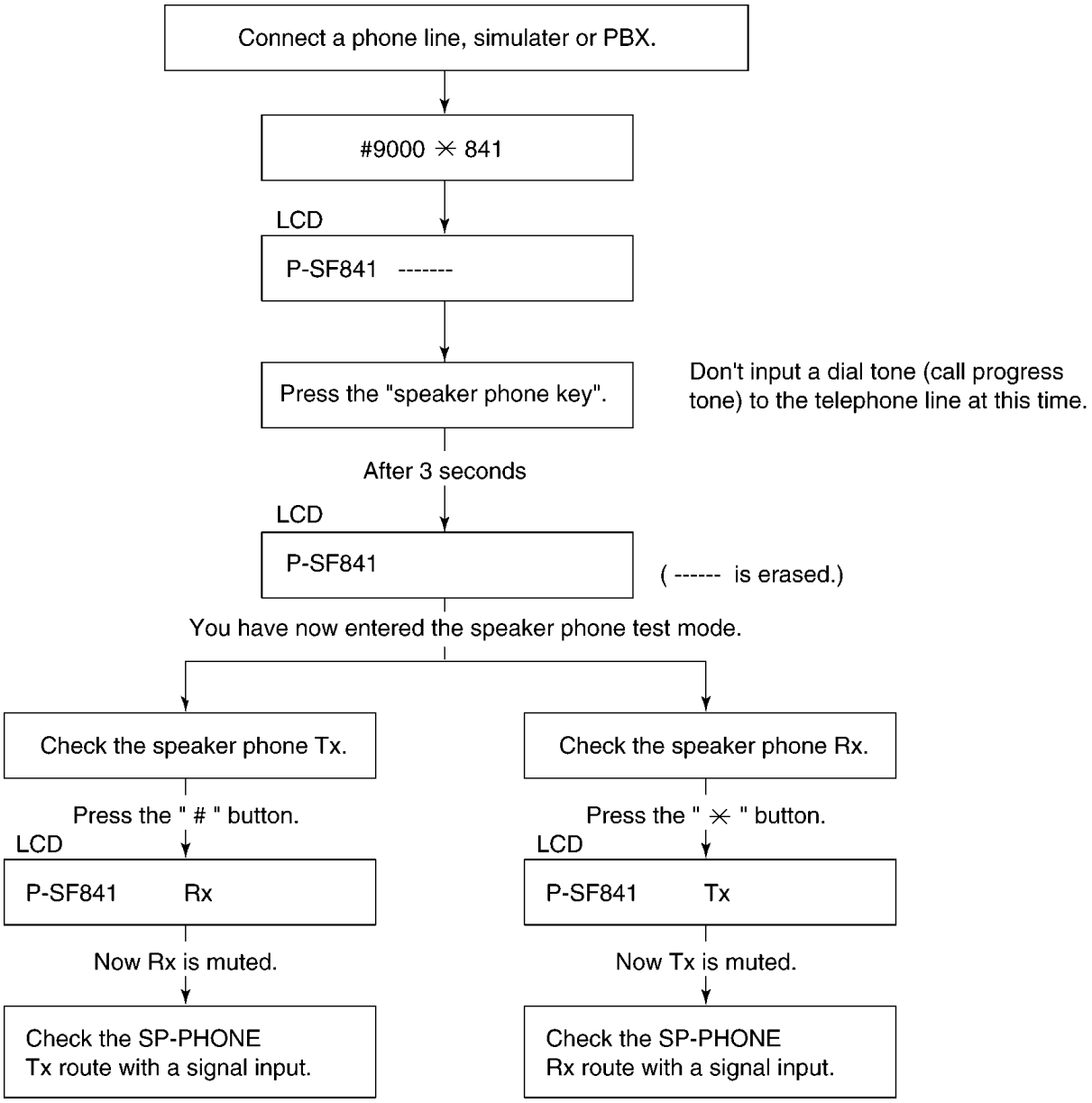


You cannot check the digital speaker phone by the signal route test mentioned in the Analog Board Section because the level is always changing as stated above.

Therefore, there is a service function for this troubleshooting. In this service mode, you can set the mute to either Tx or Rx. Then you can check the signal route of the speaker phone Tx or the speaker phone Rx without any disturbances.

HOW TO USE THE **841** SERVICE FUNCTION for THE DIGITAL SPEAKER PHONE

Please check by using the service function #9000 ✳ 841.



Refer to **2.3.3.5. Analog Board Section**.

2.3.3.6. Power Supply Board Section

1. **Key components for troubleshooting**

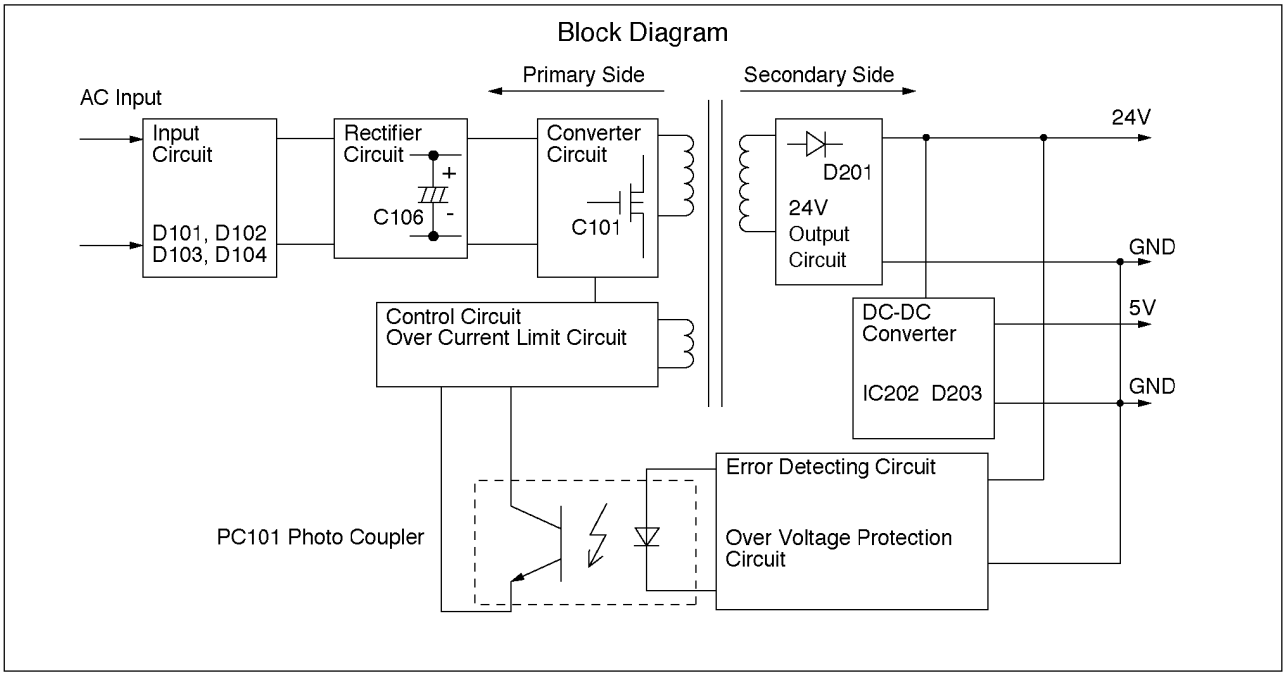
Check the following parts first: F101, D101-D104, D201, C103, C104, C105 and C110.

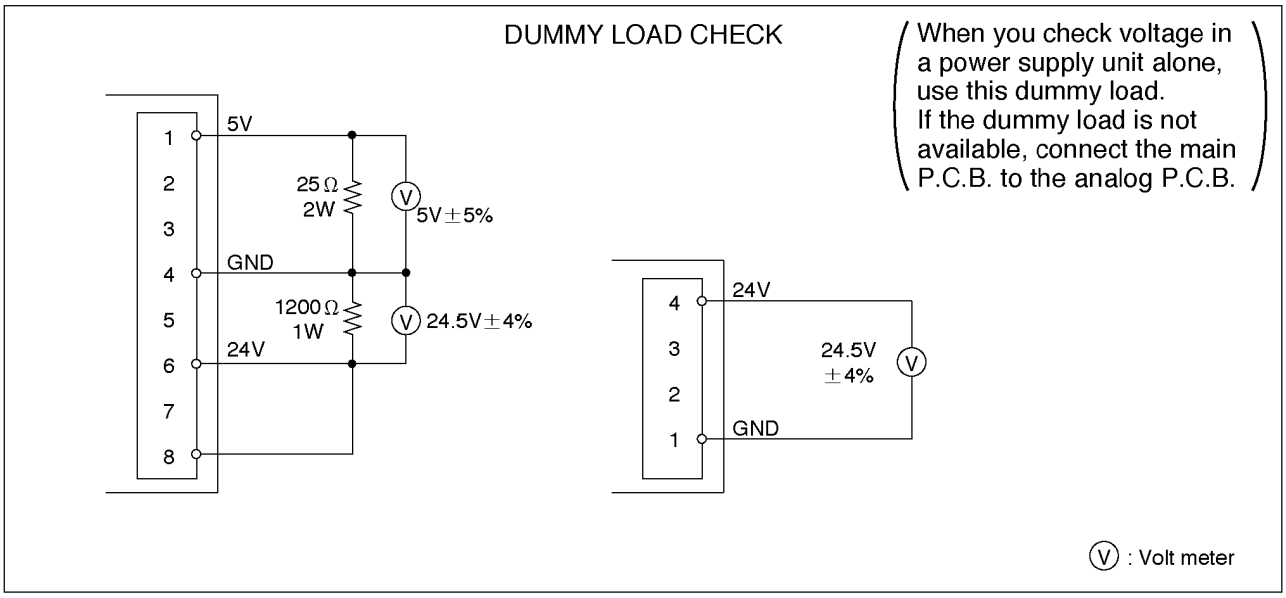
This comes from our experience with experimental tests. For example: power supply and lightning surge voltage test, withstanding voltage test, intentional short circuit test, etc.

Caution:

If you find a melted fuse in the unit, do not turn on the power until you locate and repair the faulty parts (except for the fuse); otherwise the fuse will melt again and you cannot pinpoint the faulty point.

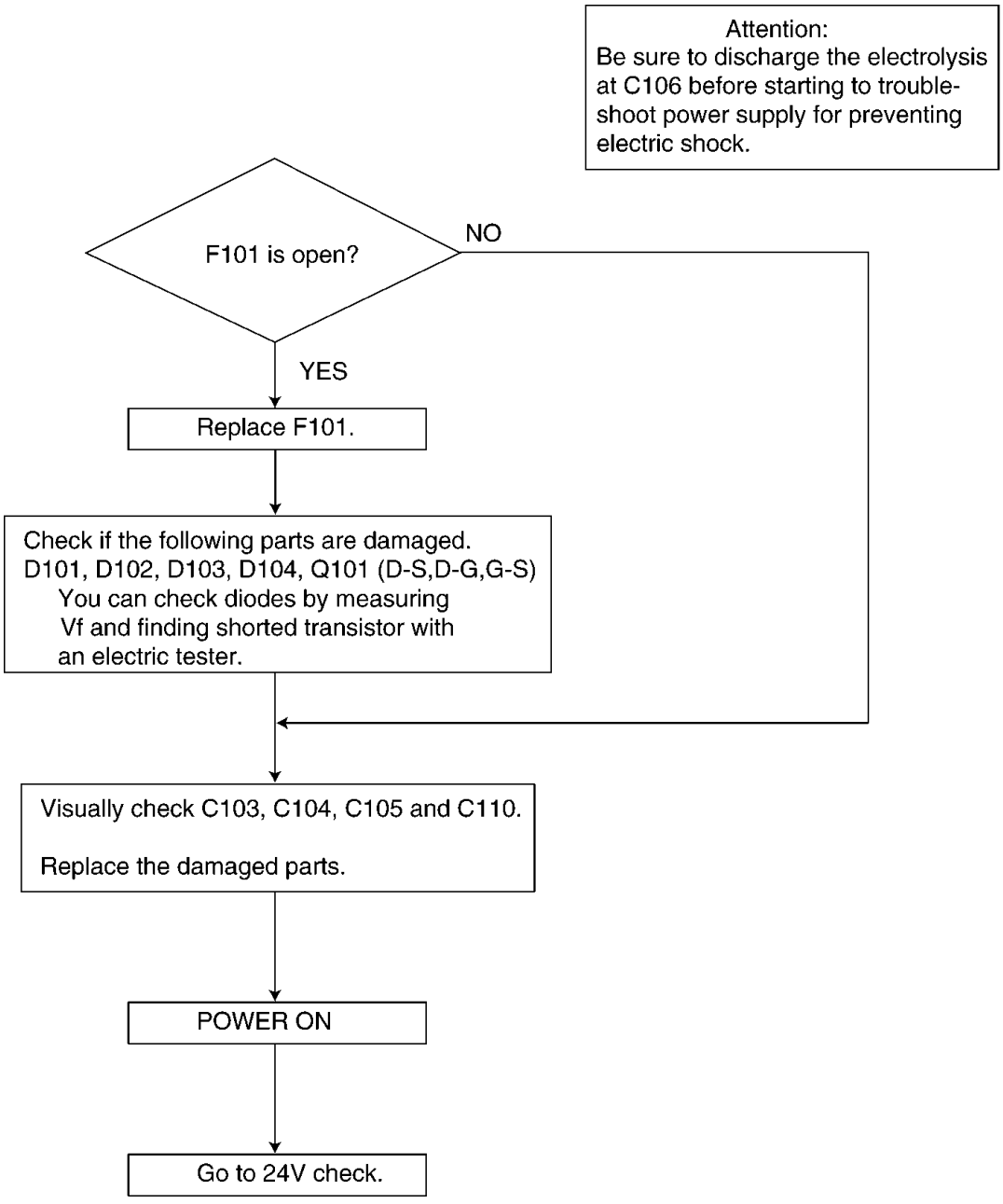
In most cases, the symptom is that nothing is output. It is more likely that the fault is in the primary side rather than the secondary side. Check the primary side first.

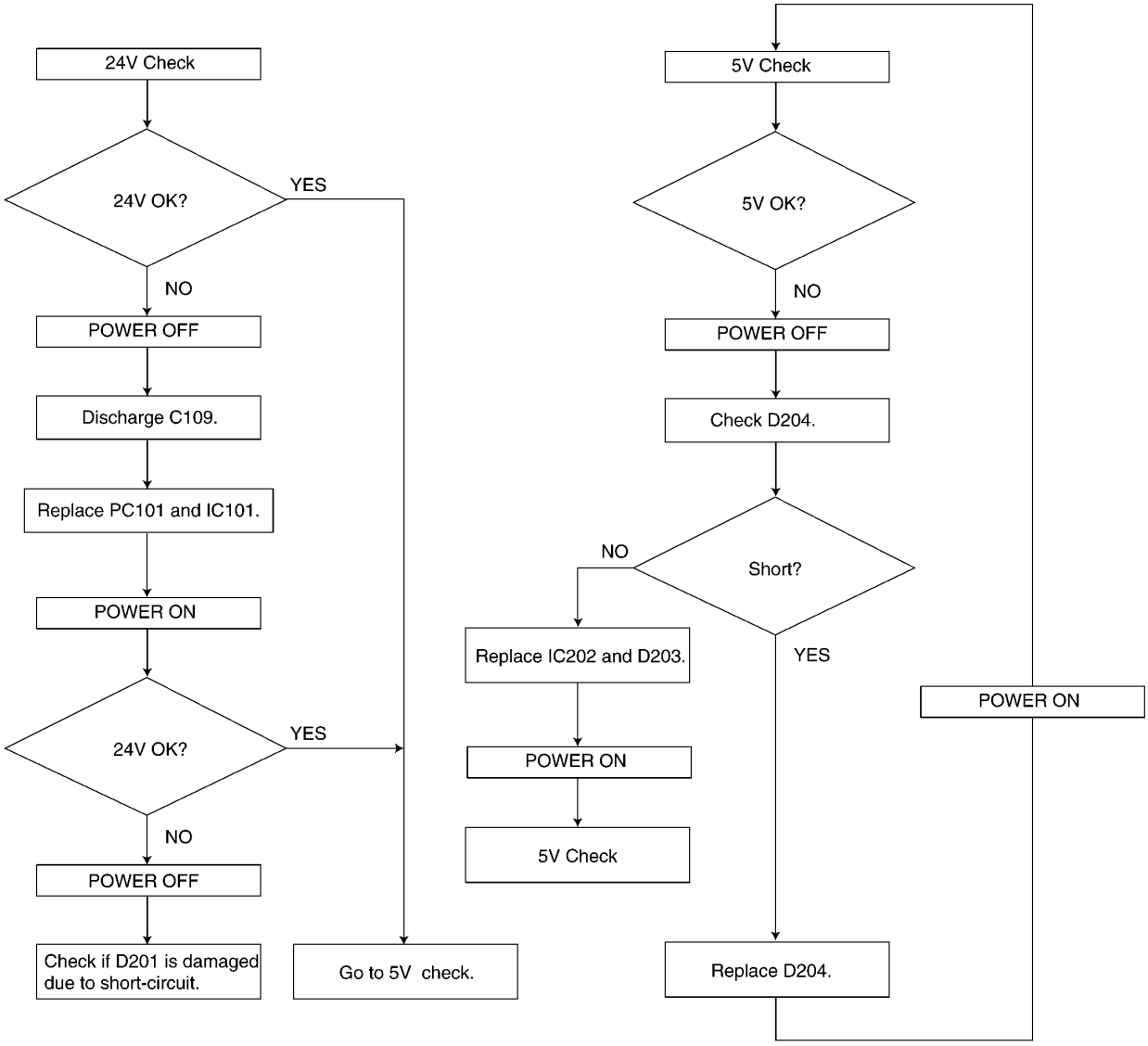




2. **Troubleshooting Flow Chart**

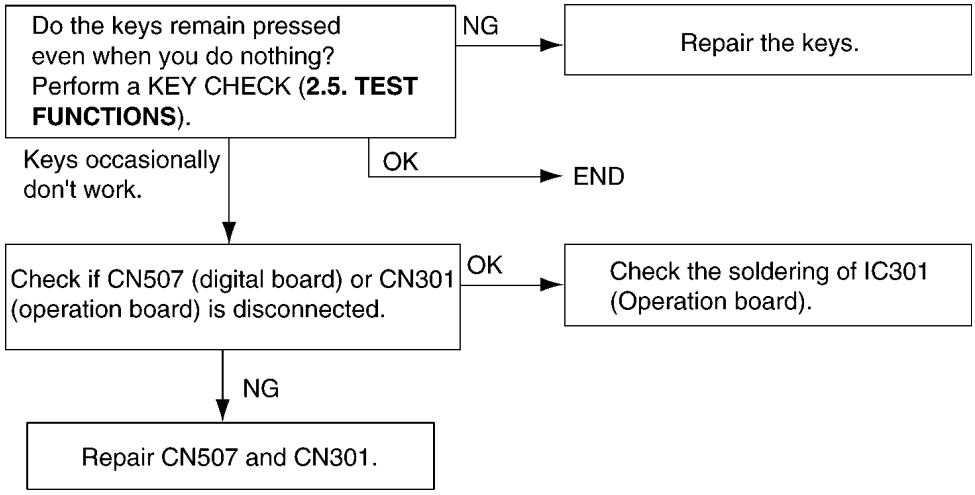
Our recommendation for troubleshooting is as follows.
This procedure comes from our exprience of troubleshooting in our lab.
* Before turning on the power supply, you should check F101.



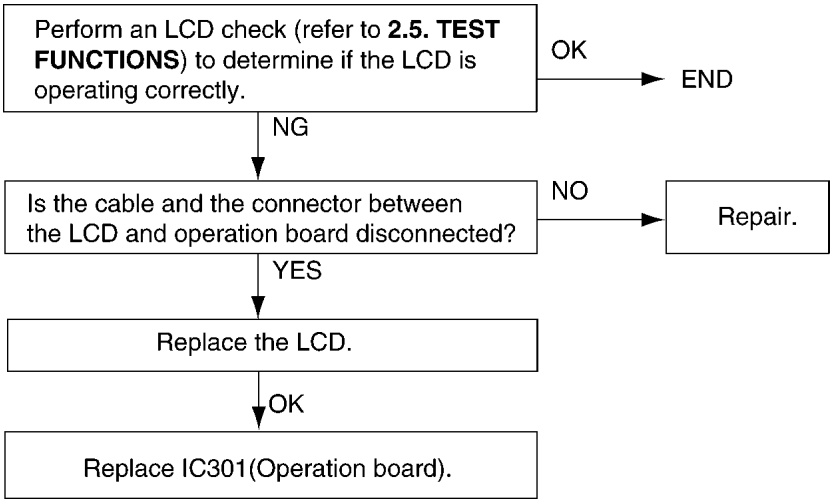

24V Check
24V OK?
YES
NO
POWER OFF
Discharge C109.
Replace PC101 and IC101.
POWER ON
24V OK?
YES
NO
POWER OFF
Check if D201 is damaged due to short-circuit.
Go to 5V check.
5V Check
5V OK?
NO
POWER OFF
Check D204.
Short?
NO
YES
Replace IC202 and D203.
POWER ON
5V Check
Replace D204.
POWER ON

2.3.3.7. Operation Panel Section

1. **No key operation**



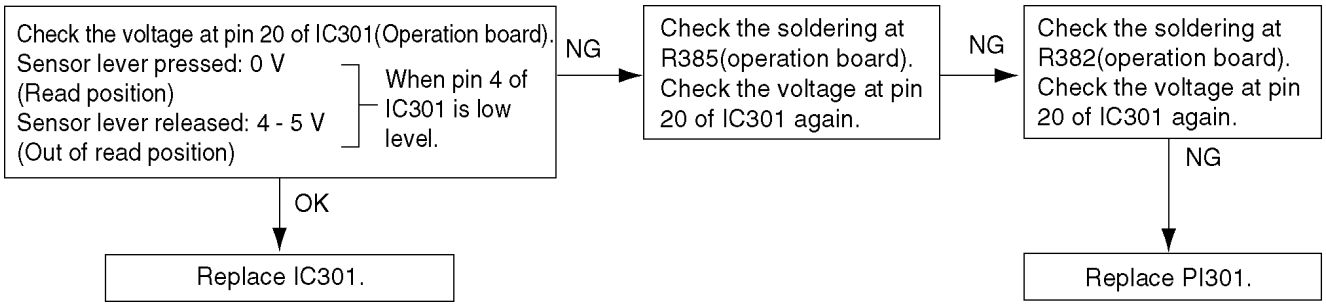
2. **No LCD indication**



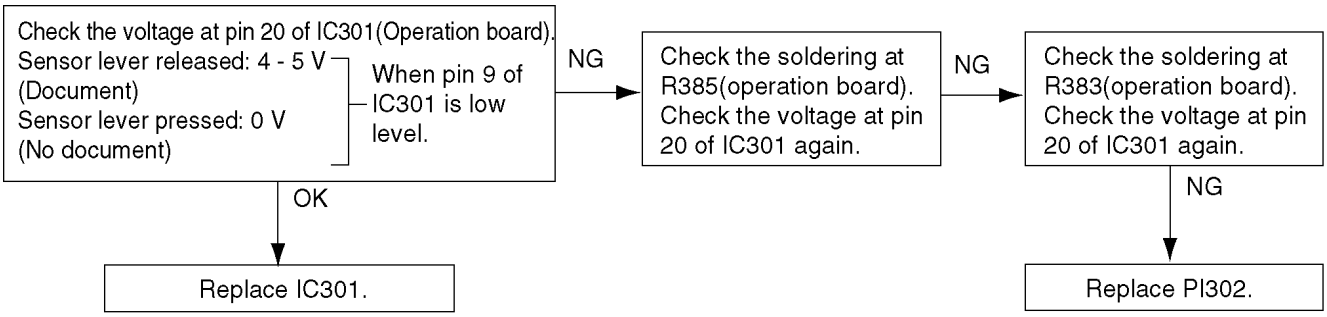
2.3.3.8. Sensor Board Section (Refer to 6.5. SENSORS AND SWITCHES for the circuit descriptions.)

The Test Function makes the sensor circuit check easier. (Refer to **2.5. TEST FUNCTIONS**.)
For example, as for "COVER OPEN SENSOR", "CO" is turned ON/OFF on the display when you open or close the front cover. Also, document sensor, read position sensor, recording paper sensor and jam sensor are turned ON/OFF by the copy operation. Therefore, each sensor can be checked for proper mechanical operation.
As for the electric check, check whether each voltage is right or not with following flowchart turning each sensor lever ON/OFF manually.

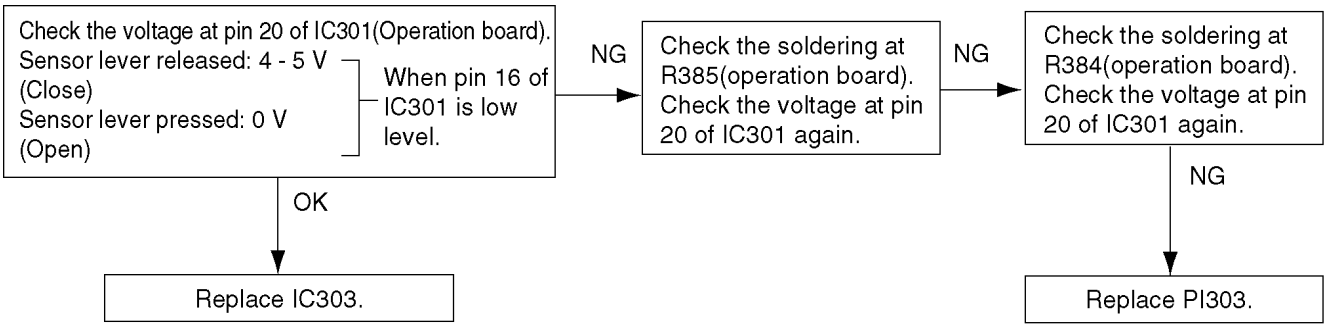
1. **Check the read position sensor (PI301)....."REMOVE DOCUMENT" (Stau beseitigen)**



2. **Check the document sensor (PI302)....."CHECK DOCUMENT" (Vorlage prüfen)**



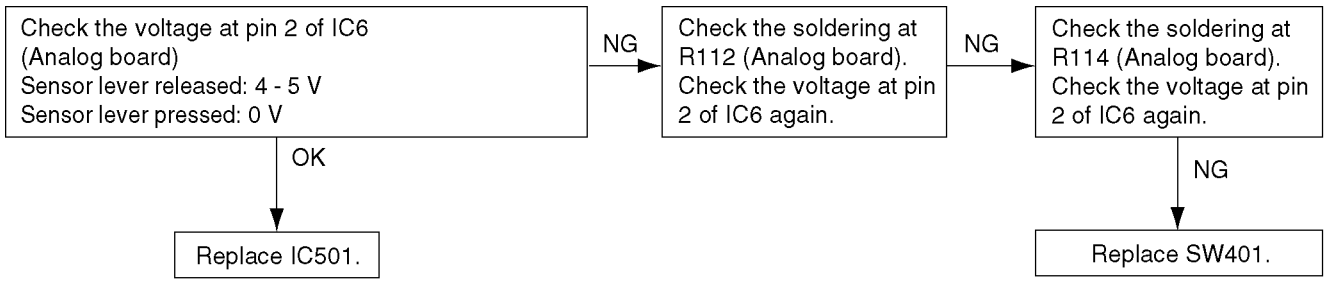
3. **Check the cover open sensor (PI303)....."CHECK COVER" (Deckel prüfen)**



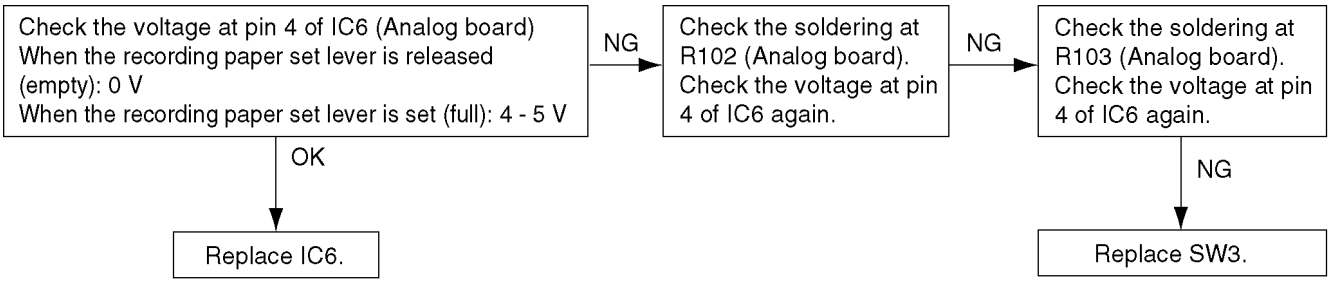
Note:

Words in brackets ( ) are German. A translated virsion for each market is available with this model series.

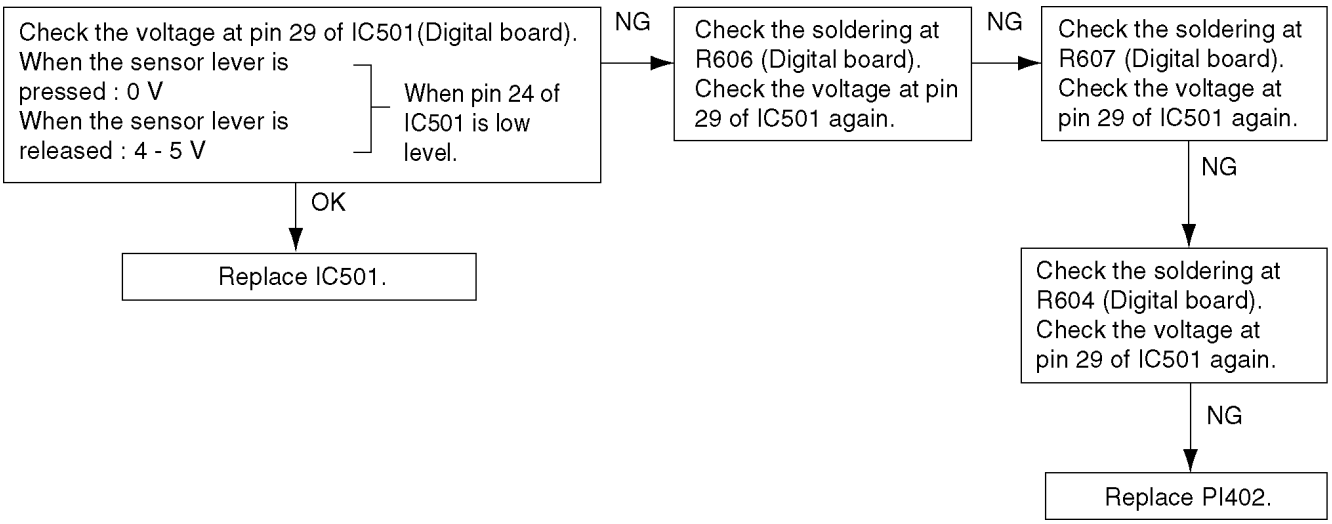
4. **Check the hook switch (SW401)**



5. **Check the paper set switch (SW3)**



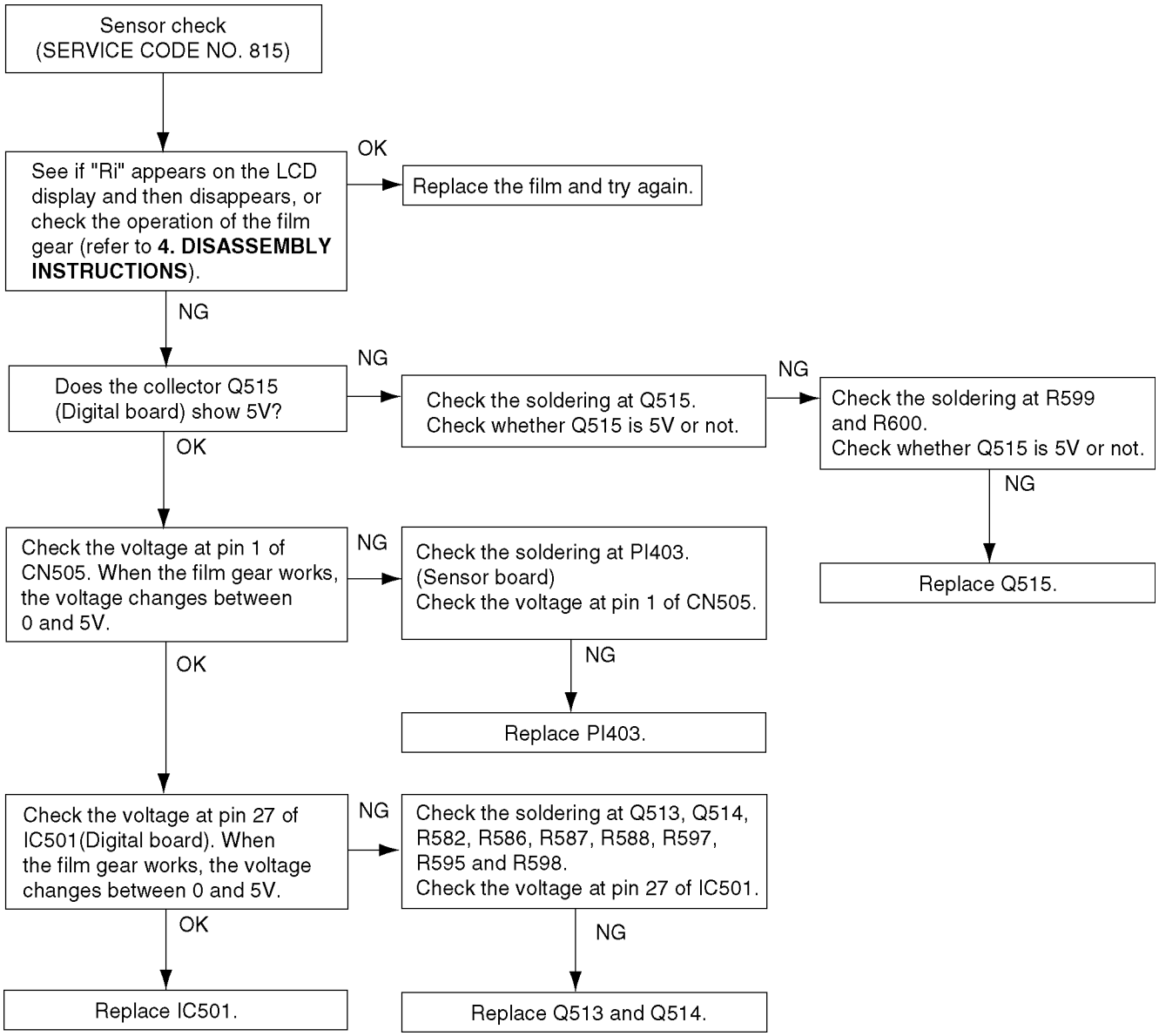
6. **Check the paper top sensor (PI402)......"PAPER JAMMED" (Papierstau)**



Note:

Words in brackets ( ) are German. A translated virsion for each market is available with this model series.

7. **Check the film end sensor (PI403)......"FILM EMPTY" (Film erschöpft)**



Note:

Words in brackets ( ) are German. A translated virsion for each market is available with this model series.

2.3.3.9. CCD Board Section

Refer to **6.4.3. READ SECTION** for circuit descriptions.

**The CCD BOARD installed on the CCD UNIT is adjusted precisely in our production line.
Therefore, if the CCD board is reinstalled while making repairs, it must be readjusted after troubleshooting. (Refer to **3.3. CCD ADJUSTMENTS.**)

If the printout is correct while receiving test printing but incorrect while copying, the read section may be broken.This is caused by the CCD UNIT or ASIC (IC501) [Digital board]. First, perform a SCAN CHECK to determine if the LED array lights. (Refer to **2.5 TEST FUNCTIONS**.)

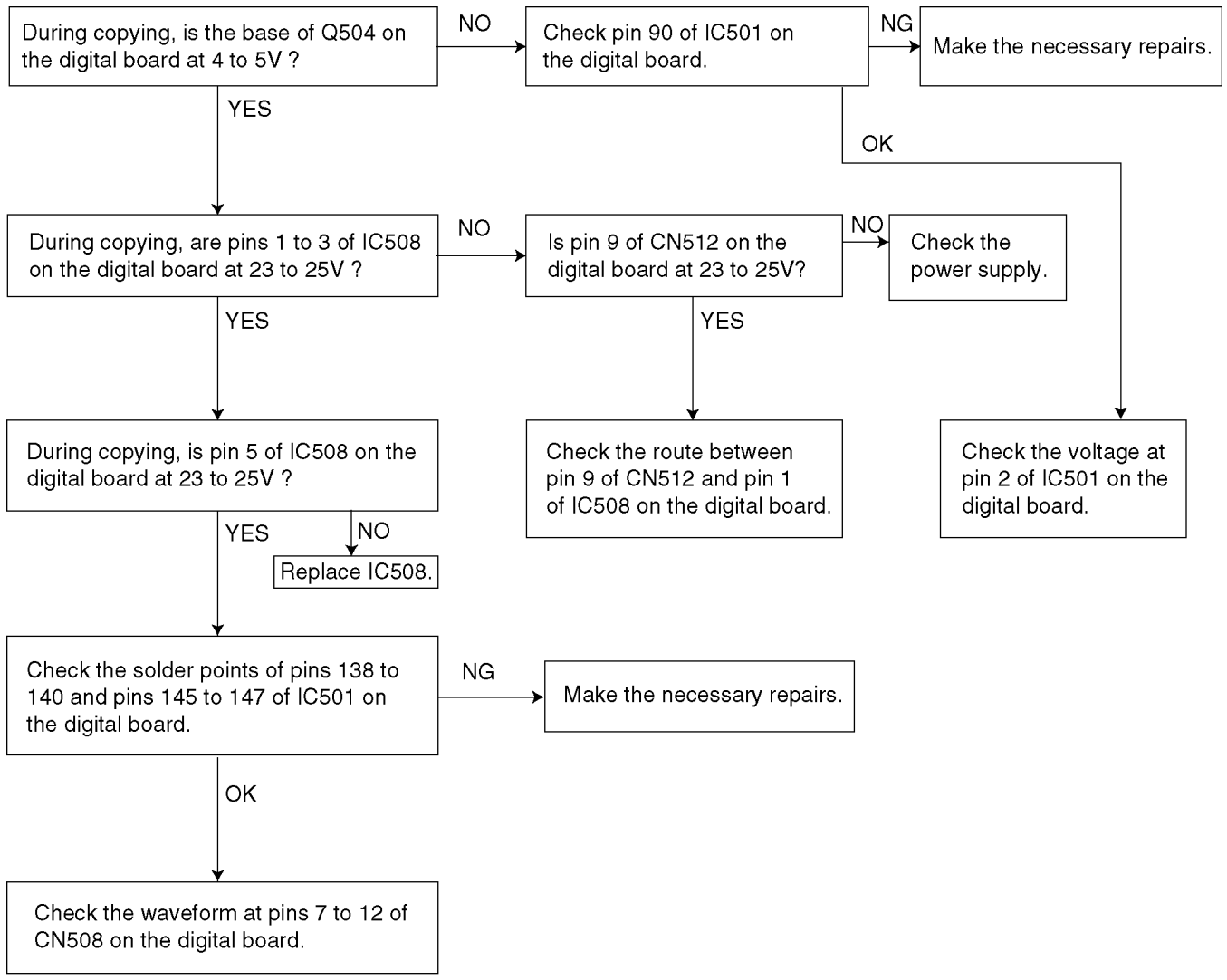
CONDITION	CAUSE	REMEDY
IC501 outputs the signal for the CCD UNIT correctly.But the CCD UNIT doesn't output an analog image signal.	The CCD board is broken.	Replace the CCD board.
IC501 outputs the signal for the CCD UNIT correctly.But the CCD UNIT outputs an analog image signal correctly.	An analog part in the ASIC is broken.	Replace IC501.
IC501 doesn't output the signal for the CCD UNIT correctly.	A logic part in the ASIC is broken.	Replace IC501.

(Check the connection between IC501 abd the CCD board)

Note:

Refer to **6.4.3. READ SECTION** for the timing description.

2.3.3.10. Thermal Head Section (Refer to 6.4.2. THERMAL HEAD.)



2.3.3.11. PANA LINK

① List of PANA LINK and help instructions
To obtain information about the PANA LINK application, use the help function.
For help, follow these steps.

For Windows 95/98 Users:

1. Click the Start button.
2. Click Programs.
3. Click PANA LINK.
4. Click PANA LINK HELP.
5. ClickIndex or Contents and choose the subject you need help with.

FUNCTIONS OF THE PANA LINK APPLICATION

Applications	Functions
PANA LINK	Introduction Hardware requirements for PANA LINK About Install/Uninstall PANA LINK How to Start and Exit PANA LINK About the PANA LINK Main Panel A List of the Shortcut Keys
PRINT	Printing from a file Checking the printing status
transmit the facsimile from the personal	About the Send a Fax panel Transmit an image file How to send a fax from a printed page Cover page Save and print of the transmission data How to make a peculiar transmission Quick transmission Sending to several people in one operation (Broadcast) Sending at a certain time Sending several documents together The Advanced dialog
receive a facsimile with the personal	Receiving a facsimile New fax notification How to make a peculiar transmission Forward the received facsimile automatically Forward the received facsimile as an e-mail message Stamp the received date (Time/Date stamp)
make a phone call	Make a phone call How to set the telephone number Dialing the telephone number manually Dial using the One-Touch keys Dial using the Address Book Dial the same person again
scan	How to scan Englarge and reduce Image quality Intensity
copy	How to copy

Applications	Functions
Communication Log	About the Communication Log About the Sent Log About the Received Log About the Outbox Save the log Print the log Display the image of the facsimile document Send the log as an e-mail message Resend Change the destination of an unsent fax Forward Delete Change a log subject Find About the Find dialog box Sort Menu list
Address Book	About Address Book How to edit the data of the partners How to add a new entry How to update How to delete How to edit the Address Book How to create a new Address Book How to change the name of the Address book How to delete an Address Book How to change the Address Book How to edit the distribution group How to create a group How to change the group name How to delete a group How to add members to a group How to change groups How to select the number Sending a phone or fax number from the Address Book to the PANA LINK Main Panel How to move and copy Move and copy Other functions Find Sorting Simple print of the Address Book Print the Address Book in detail form Import and export the Address Book Save the Address Book Menu list Shortcut keys
Viewer	About the Viewer
Setup	Setup Line setup Transmission setup Reception setup System setup User Information Cover Page
One-touch	One-touch keys How to register and change an entry How to delete an entry How to switch between fax and phone numbers How to select a number
Troubleshooting	Common problems Problems with transmission Problems with reception Problems with scan and copy Problems with connection Problems about the display of errors

A. Problems with PC software

1)-1 General

Problem	Cause & Remedy
I cannot open a TIFF file.	● You must change the compression format of the file. For example, to convert an image using WANG Imaging, proceed as follows: **1.** Click on **[Start]**, point to **[Programs] — [Accessories],** then click **[Imaging]**. **2.** Open the TIFF file that you cannot open in **[Viewer]** of PANA LINK. **3.** Open the **[Page]** menu, and click **[Convert]**. —The **[Convert]** dialogue box appears. **4.** Click the **[Compression]** tab, then choose **[CCITT Group 3 (1d) Modified Huffman]** from the Compression drop-down list. **5.** Click **[OK]**. —The file's compression format is changed.
I cannot send a fax from the PC at the specified time.	● The date and time of the PC may be set incorrectly. Adjust it. If it cannot be set correctly, consult your PC supplier.
The date and time that prints on the top of each page sent from the PC is incorrect.	● The date and time of the PC may be set incorrectly. Adjust it. If it cannot be set correctly, consult your PC supplier.
I do not know how to move the PANA LINK main panel, because there is no title bar.	● Point to an area with no buttons and drag to the desired space.
I do not know whether the PANA LINK main panel is active or not.	● The brightness of the main panel display shows you whether or not the PANA LINK main panel is active. **<Active – bright, Non active – dark>**
A quick tip does not appear when I hold the mouse pointer over a button in the PANA LINK main panel, although I have set to display this.	● If the PANA LINK main panel is non-active, the quick tip does not appear. Confirm again after making the PANA LINK main panel active by clicking anywhere on it.
The telephone number set in the main panel display disappears, and the display shows **[For storing a phone or fax number.]** explanation of the button and so on.	● The quick tip is displayed. Move the mouse cursor out of the PANA LINK main panel. If you do not need quick tips, open the **[Setup]** dialogue and select **[OFF]** of **[Quick Tip]** in **[System]** tab.
The PANA LINK main panel disappears.	● Look in the task tray (in the task bar). If you do not find the PANA LINK icon, it is closed. If you find the icon, the PANA LINK main panel is just minimised or reduced to an icon. Double-click the icon in the task tray or open the menu by right-clicking the fax icon and select **[Restore]**
PANA LINK main panel disappears just after initialising.	● The PANA LINK main panel is set to minimise when PANA LINK starts. Double-click the icon in the task tray or open the menu by right-clicking the fax icon, and select **[Restore]** If you do not want this to happen each time you start PANA LINK, click the **[Setup]** in the PANA LINK main panel, and leave the **[Start minimized]** check box blank in the **[Program start-up settings]** in **[System]** tab.
I want to delete all of the telephone numbers set in the main panel display.	● Press **[STOP]** button.

Note: Bold words can be translated into German.

1)-2 General (cont.)

Problem	Cause & Remedy
I cannot recognise the last part of the entry in the address list of the **[Address Book]** or **[Communication Log]**.	• Put the cursor on the line between the buttons, the cursor changes shape and you can expand the area by dragging, or double-clicking.
I do not want to send a cover page with every fax.	• The setting of the cover page is **[ON]**. To deactivate the setting, open **[Setup]** dialogue by clicking on the **[Setup]** in the main panel, and check **[Default Add Cover Page at every Transmission]** in the **[Cover Page]** tab.
I wanted to select a telephone number from **[Address Book]** onto the PANA LINK main panel, but I selected a fax number by mistake.	• You can change your selection in the PANA LINK main panel. Double click on the number in the main panel display until the telephone number appears. You can also right-click the entry to select a specific number.
I cannot use the **[DIAL]** button, even though I specified a telephone number.	• If there is transmission data or a document is set in the fax, you can only use the fax transmission function. If you want to make a phone call, delete the transmission data.
When I exit PANA LINK, the **[Viewer]** does not close.	• **[Viewer]** can be operated separately, so when PANA LINK is closed, it remains open.
PANA LINK does not work properly.	• Click the button to exit PANA LINK, and restart. If PANA LINK still does not close, press the **[Ctrl+Alt+Delete]**

2) Printing

PROBLEM	CAUSE & REMEDY
I cannot print.	• Please verify the following. **1.** Driver settings:If you change the driver settings in the Panasonic PANA LINK-S PRINNT dialogue box, you may be able to print. **2.** Preview window:If the image is not properly displayed in the Preview window, your file may contain errors. Try printing a different file. Also, there may be a problem with the application you are using. **3.** Bad connection between PC and printer: Verify the printer is properly connected and plugged in. **4.** Re-install: Uninstall PANA LINK, reboot your PC, then re-install it. **5.** Port setting: If the printer port is not set properly, you cannot print. 1) Click the **Start** button, point to **Settings**, then **Printer** . 2) Choose **Properties** from the printer's pop-up menu. –The Properties dialogue box appears. 3) Click the **Details** tab, and check the **Print to the following port** drop down list box. If a different port is selected, Choose the serial port COM1-COM4 connected with the fax machine in the Available port list. 4) Click the **Print the using the following driver** drop down list box. If **PANA LINK-S PRINT** is not selected, re-select it. 5) Click the **Port setting** button. · Set each parameter as follows: · Bits per second: 19200 · Data bits: 8 · Parity: None · Stop bits: 1 · Flow control: Hard ware 6) Click the **OK** button. 7) Click the **OK** button.

Note: Bold words can be translated into German.

3) Transmisson

Problem	Cause & Remedy
[Sending a fax failed.] message is displayed.	● Possible causes are as follows. —Telephone circuit is not good. —You received a call-waiting signal. —The other party stopped reception. —The other party ran out of recording paper. Transmit again after checking with the other party.
[No response] message is displayed.	● The other party did not answer the call or the line was busy. Transmit again after waiting a while. ● The dialling mode setting (tone or pulse) is not correct. Open the **[Setup]** dialogue box and check the dialling mode setup check box in **[Line]** tab.
I cannot make an international transmission.	● Set the fax machine to the overseas transmission mode. See the operating instructions.
The length of the transmitted image differs slightly from the original.	● Set the **[Resolution]** to **[Fine]** (200 x 200dpi) and transmit again.

4)-1 Reception

Problem	Cause & Remedy
The fax machine receives a fax, but I want to receive it on the PC.	● You may have checked **[Receive directly to facsimile unit]** in the **[Reception]** tab in the **[Setup]** dialogue box. If so, click this check box to deactivate. ● The setting of the PC LINK on the fax machine is off. Turn it on. ● The PANA LINK application is not operate. Start the PANA LINK application.

4)-2 Reception (cont.)

Problem	Cause & Remedy
The PC receives a fax, but I want to receive it on the fax machine.	● Open the **[Setup]** dialogue box, and check **[Receive directly to facsimile unit]** in the **[Reception]** tab.
I want to print out the received fax with another printer.	● Print after selecting the desired printer from the **[Print]** dialogue box.
[Receiving a fax failed.] message is displayed.	● Possible causes are as follows. —The line condition was not good. —The reception was interrupted by a call waiting signal. Check with the other party and try again.

Note: Bold words can be translated into German.

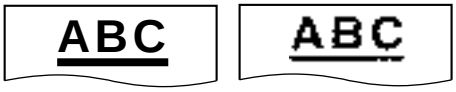
5) Scan and copy

Problem	Cause & Remedy
I cannot scan.	● The fax machine may be in use. Try again after the other operation is completed. ● There may not be enough space on the hard disk. Try again after deleting unnecessary files or closing unused applications. ● There might not be enough RAM. Try again after closing some applications. Restart the PC, and try again.
The document is not pulled into the document feeder.	● Confirm that a maximum of 15 pages are set correctly.
A document is jammed.	● You attempted to transmit a document longer than 600 mm. Remove the jammed document and try again.
The recording paper is jammed.	● Remove the jammed recording paper, reinsert it, and try again.
Even after clicking **[Stop]**, scanning continues.	● Please wait. It may take a while for the cancel request to be accepted.

6) Error message

Problem	Cause & Remedy
[Initialization failed.] is displayed.	● Check the connection of the PC and the fax machine. ● The setting of the PC LINK on the fax machine is off. Turn it on.

7) Print quality

Problem	Cause & Remedy
The printing quality is poor.	● Some paper has instructions recommending which side to print on. Try turning the paper over.
The printing is faint. Original Copy 	● You may have used paper with a cotton and/or fiber content that is over 20 %, such as letterhead or resume paper.
A dirty pattern or a black line appears on the printouts.	● The glass or rollers are dirty. Clean them. See the operating instructions.

Note: Bold words can be translated into German.

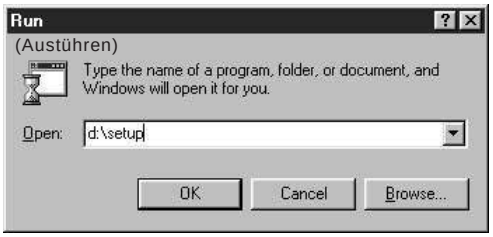
1 Start Windows 95 or Windows 98 and close all applications.

2 Insert the included CD into your CD-ROM drive.

- The **[Choose Setup Language]** dialogue box will appear.
  Select the desired language that you use with this software from the pull-down menu.
  Click **[OK]**.



- If **[Choose Setup Language]** dialogue box does not appear:
  The installation will automatically start.
- If **[Choose Setup Language]** dialogue box does not appear and the installation does not start automatically:
  Click **[Start]**, choose **[Run...]**. Type "**d:\setup**" (where "**d:**" is the drive letter of your CD-ROM drive). Click **[OK]**.
  (If you are not sure what the drive letter is for your CD-ROM drive, please use



3 The installation will automatically start.



4 Follow the instructions on the screen until all files have been installed.

5 Be sure to read the **[Readme]** file for more information.

Note:

- For detailed instructions on PANA LINK software, use the **[Help]** function.
- The screens shown in these instructions are

- **The display illustrations may differ slightly from the display of the actual product.**
- **The display details are subject to change for improvement without notice.**

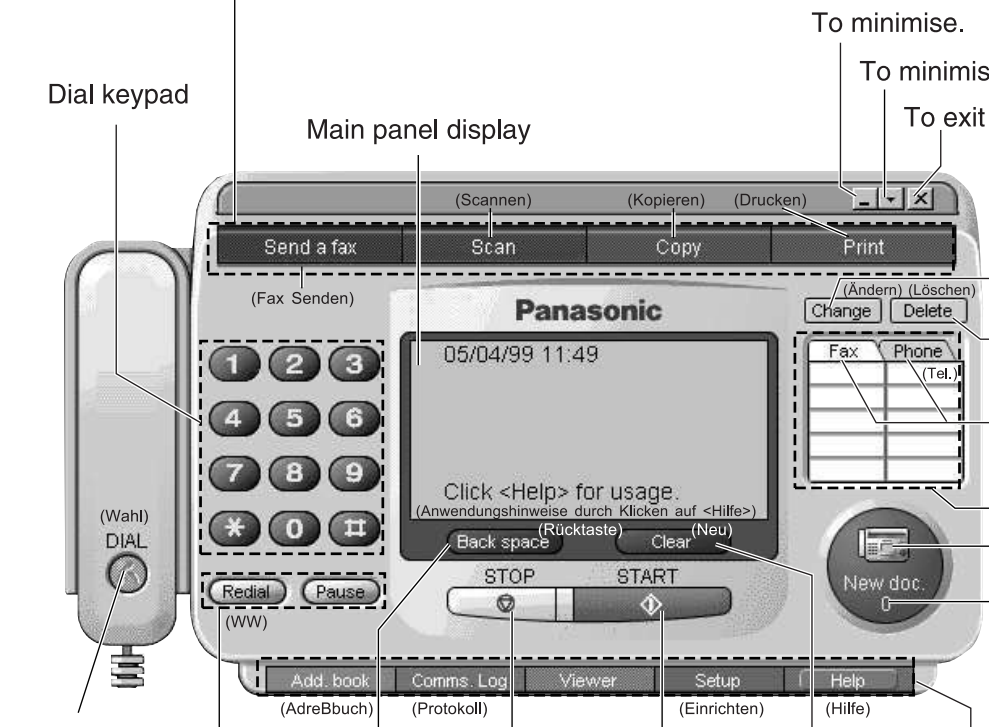
Note: Bold words and messages in a dialog box can be translated into German.

1 Click **[Start]**.

2 Point to **[Programs]**, point to **[PANA LINK]** and click **[PANA LINK]**.

- The PANA LINK main panel will appear.

Send a fax To send a file created on the PC.	**Scan** To create an image file by scanning the document set in the fax machine.	**Copy** To make a copy of the document set in the fax machine.	**Print** To print a file created on the PC.



Redial To redial the last number dialled.
Pause To insert a pause in the telephone number.

Add. book To store and view information in your address book.	**Comms. Log** To display the record of transmitted/received fax documents and manage the documents waiting to be sent.	**Viewer** To display an image sent or received with PANA LINK.	**Setup** To set PANA LINK options.	**Help** For detailed instructions on PANA LINK software.

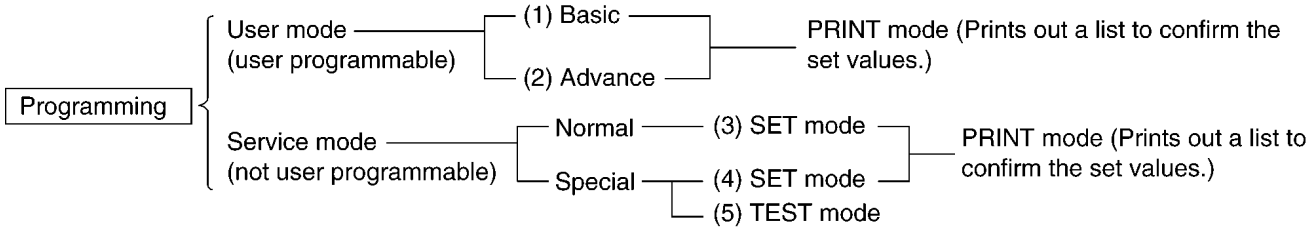
2.4. PROGRAMMING AND LISTS

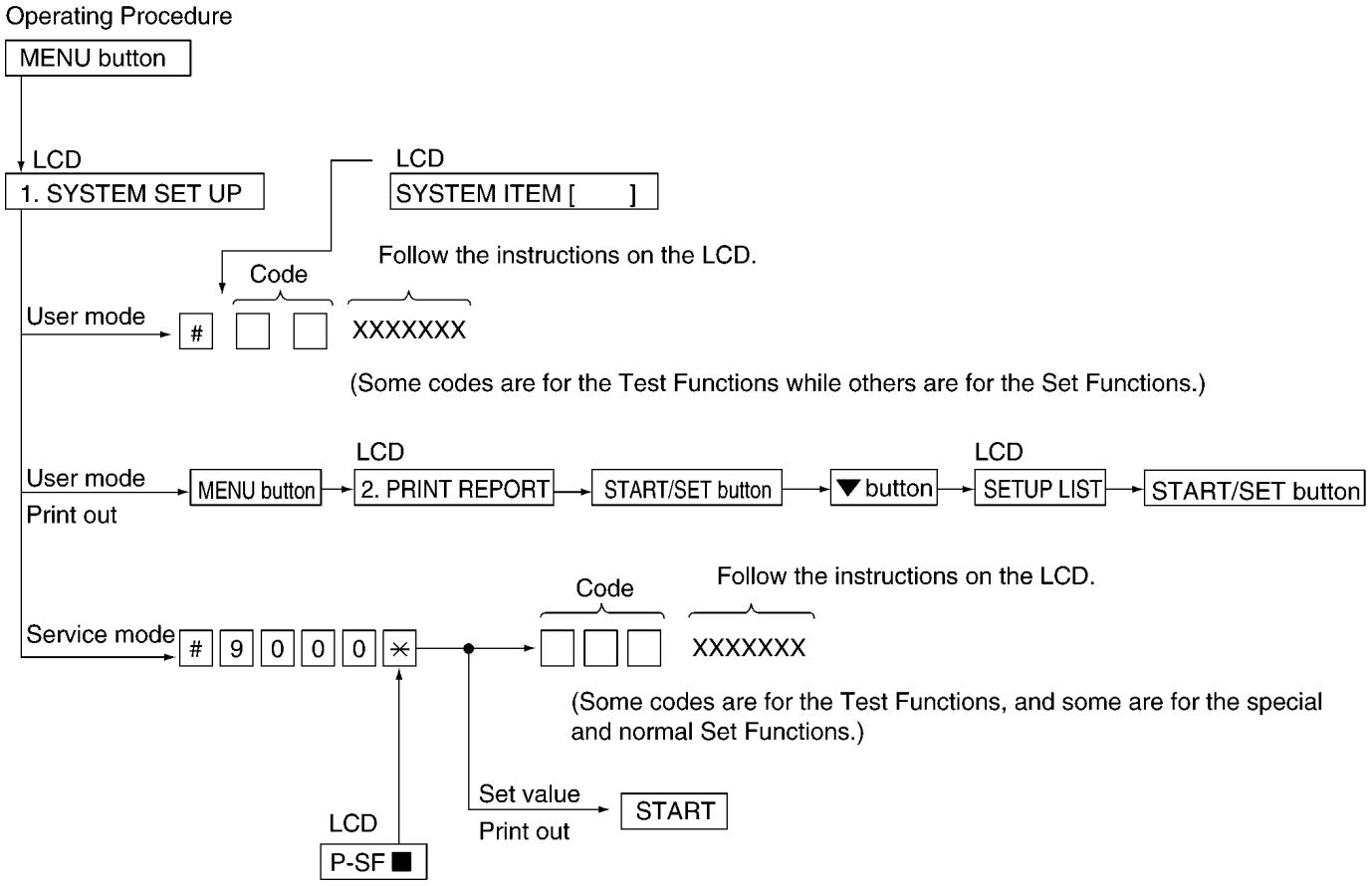
The programming functions are used to program the various features and functions of the machine, and to test the machine. This facilitates communication between the user and the service while programming the machine.

2.4.1. OPERATION

There are 2 basic categories of programming functions, the User Mode and the Service Mode. The Service Mode is further broken down into the normal and the special programs. The normal programs are those listed in the Operating instructions and available to the user. The special programs are those listed only here and not displayed to the user. In both User and Service Mode, there are Set Functions and Test Functions. The Set Functions are used to program various features and functions, and the Test Functions are used to test various functions . The Set Functions are accessed by entering their code, changing the appropriate value, then pressing the SET key. The test Functions are accessed by entering their code and pressing the key listed on the menu. While programming, to cancel any entry, press the STOP key.

2.4.2. OPERATION FLOW





2.4.3. USER MODE (The list below is an example of the SYSTEM SETUP LIST the unit prints out.)

Einstellungen

【 Grundeinstellungsliste 】

Nr.	Leistungsmerkmal	Gegenwärtige Einstellung	
#01	Datum & Uhrzeit	01 Jan. 1999 00:01	
#02	Ihr Logo		
#03	Teilnehmerkennung		
#04	Ausdruck Übertragungsbericht	Fehler	[Fehler,Ein]
#06	Rufzähler TAM/FAX	2	[1...4,Fernvorabfrage,Tonruf aus]
#10	Aufnahmezeit	4 Min	[Vox,1...9Min]
#11	Fernabfr. Code Code =	111	
#13	Wahlverfahren	MFV	[MFV,IWV]
#14	PC Verbindung (KX-FM330 ONLY)	Ein	[Ein,Aus]
#15	Speicherübertragung	Aus	[Ein,Aus]

【 Erweiterte Einstellungsliste 】

Nr.	Leistungsmerkmal	Gegenwärtige Einstellung	
#22	Automatischer Journalausdruck	Ein	[Ein,Aus]
#23	Übersee-Modus	Aus	[Ein,Aus]
#25	Zeitversetzte Übertragung	Aus	[Ein,Aus]
	Ziel =		
	Startzeit =	00:00	
#26	Anrufliste	Ein	[Ein,Aus]
#30	Rufzähler Faxweiche	3	[3...6]
#36	Verkleinerung	92%	[92,86,72,100]
#39	LCD-Kontrast	Normal	[Normal,Dunkel]
#41	Fax Ferneinschaltung	Ein	[Ein,Aus]
	Einschaltcode =	*9	
#42	Nachrichtenhinweis	Aus	[Ein,Aus]
#43	Aufnahmehinweis	Aus	[Ein,Aus]
#44	Empfangs-Signalisierung	Ein	[Ein,Aus]
#46	Erweiterter Empfang	Ein	[Ein,Aus]
#47	Fax Bedienerführung	Ein	[Ein,Aus]
#48	Sprache	Deutsch	[Deutsch,English]
#54	Ansagezeit	16Sek.	[16Sek,60Sek]
Hinweis : Beim Ändern der Ansagezeit von 60Sek. auf 16Sek. wird der Ansagetext gelöscht.			
#60	Express-Modus	Aus	[Ein,Aus]
#61	TelefonanschluB	AMT	[AMT,NBST.]
#62	Signal-Taste[✱]	FLASH	[ERDE,FLASH]
#63	AKZ 1 =		
#64	AKZ 2 =		
#65	AKZ 3 =		
#66	AKZ 4 =		
#67	Anrufbeantw. Monitor	Ein	[Ein,Aus]
#68	ECM-Übertragung	Ein	[Ein,Aus]
Hinweis: Sind Dokumente im Speicher abgelegt, ist dieser Parameter nicht veränderbar			
#71	Rufmelodie	A	[A,B,C]
#76	Verbindungston	Ein	[Ein,Aus]
#77	Autom.Antwort	TAM/FAX	[TAM/FAX,FAX,TEL/FAX]
#78	TEL/FAX Rufe	2	[1...9]
#79	Filmerkennung	Ein	[Ein,Aus]
#80	Standardeinstellung (mit Ausnahme von #48,#68)		

Note:

The above values are default.

2.4.4. SERVICE FUNCTION TABLE

Code	Function	Set Value	Effective Range	Default	Remarks
501	Pause time set	X 100 ms.	001~600	030	
502	Flash time set	X 10 ms.	01~99	08	
503	Dial speed select	1:10 pps 2:20 pps	1, 2	1	
511	VOX sense	1:High 2:Low	1, 2	1	
520	CED frequency select	1:2100 Hz 2:1100 Hz	1, 2	1	See the **Symptom/ Countermeasure Table** for long distance and international calls in **2.3.3.3.1. Defective facsimile section**.
521	International mode select	1:ON 2:OFF	1, 2	2	See the **Symptom/ Countermeasure Table** for long distance and international calls in **2.3.3.3.1. Defective facsimile section**.
522	Auto standby select	1:ON 2:OFF	1, 2	1	The resolution reverts to the default when transmission is complete.
523	Receive equalizer select	1:0km 2:1.8km 3:3.6km 4:7.2km	1~4	1	When the telephone station is far from the unit or reception cannot be performed correctly, adjust accordingly.
524	Transmission egualizer select	1:0km 2:1.8km 3:3.6km 4:7.2km	1~4	1	When the telephone station is far from the unit or transmission cannot be performed correctly, adjust accordingly.
546	Flash time (CO)	X 10 ms.	01~99	20	
550	Memory clear: To reset the value to the default one, except the top margin (853)and left margin (854).				"START" input.
551	ROM check				"START" input.
552	DTMF single tone test	1:ON 2:OFF	1, 2	2	See **2.5. TEST FUNCTIONS**.
553	Monitor on FAX communication select	1: OFF 2:PHASE B 3:ALL phases	1~3	1	
554	Modem test				See **2.5. TEST FUNCTIONS**.
555	Scan check				See **2.5. TEST FUNCTIONS**.
556	Motor test			00	See **2.5. TEST FUNCTIONS**.
557	LED test				See **2.5. TEST FUNCTIONS**.
558	LCD test				See **2.5. TEST FUNCTIONS**.
559	Paper jam detection select	1:ON 2:OFF	1, 2	1	See **2.2.1. Paper Jam**.
561	KEY test				See **2.5. TEST FUNCTIONS**.
570	BREAK % select	1:61% 2:67%	1, 2	1	Sets the % break of pulse dialing according PBX.
571	ITS auto redial time set	X number of times	00~99	11	Selects the number of times that ITS is redialed (not including the first dial).
572	ITS auto redial line disconnection time set	X second	001~999	060	Sets the interval of ITS redialing.
573	Remote turn-on ring number set	X number of rings	01~99	10	Sets the number of rings before the unit starts to receive a document in the TEL mode.
580	TAM continuous tone detection	1:ON 2:OFF	1, 2	1	ON: STOP TAM operation when Dial tone, etc. are detected.
590	FAX auto redial time set	X number of times	00~99	11	Selects the number of redial times during FAX communication (not including the first dial).
591	FAX auto redial time disconnection time set	X second	001~999	060	Sets the FAX redial interval during FAX communication.
592	CNG transmit select	1:OFF 2:ALL 3:AUTO	1~3	2	Lets you select the CNG output during FAX transmission. ALL: CNG is output at phase A. AUTO: CNG is output only when automatic dialing is performed. OFF: CNG is not output at phase A.
593	Time between CED and 300bps	1: 75 ms. 2:500 ms. 3:1 sec	1~3	1	See the Symptom/Countermeasure Table for long distance and international calls in **2.3.3.3.1. Defective facsimile section**.
594	Overseas DIS detection select	1:detects at the 1st time 2:detects at the 2nd time	1, 2	1	See the Symptom/Countermeasure Table for long distance and international calls in **2.3.3.3.1. Defective facsimile section**.

Code	Function	Set Value	Effective Range	Default	Remarks
595	Receive error limit value set	1:5% 2:10% 3:15% 4:20%	1~4	2	Sets the number of acceptable error lines when the FAX reconstructs the received data.
596	Transmit level set	X dBm	-15~00	10	Selects the FAX transmission level.
598	Receiving sensitivity	43= -43 dBm	20~48	44	Used when there is an error problem. See the Symptom/Countermeasure Table for long distance and international calls in **2.3.3.3.1. Defective facsimile section**.
624	AT ring time out	1:3 sec 2:5 sec	1, 2	1	--------
717	Transmit speed selection	1:14400BPS 2:12000BPS 3:9600BPS 4:7200BPS 5:4800BPS 6:2400BPS	1~6	1	Adjusts the speed to start training during FAX transmission.
718	Receive speed selection	1:14400BPS 2:12000BPS 3:9600BPS 4:7200BPS 5:4800BPS 6:2400BPS	1~6	1	Adjusts the speed to start training during FAX reception.
719	Ringer off in TEL/FAX mode	1:ON 2:OFF	1, 2	1	Sets the ringer switch off when a call is received in the TEL/FAX mode.
721	Pause tone detect	1:ON 2:OFF	1, 2	2	Selects the tone detection for pause in dialing.
722	Redial tone detect	1:ON 2:OFF	1, 2	1	Selects the tone detection mode after redialing.
724	PC-FAX ATD busy tone detect	1:ON 2:OFF	1, 2	1	--------
745	Power ON film feed	1:ON 2:OFF	1, 2	1	
763	CNG detect time for friendly reception	1:10 sec 2:20 sec 3:30 sec	1~3	3	Selects the CNG detection tome of friendly reception.
771	T1 timer	1:35 sec 2:60 sec	1, 2	1	Sets a higher value when the response from the other party needs more time during FAX transmission.
775	Monitoring of message transfer	1:ON 2:OFF	1, 2	2	--------
784	Voice prompt test				Press “START”.
815	Sensor & Vox check				See **2.5. TEST FUNCTIONS**.
852	Print test pattern				See **2.5. TEST FUNCTIONS**.
853	Top margin		1~9	--------	
854	Left margin		1~8	--------	
861	A4 size set	1:ON 2:OFF	1, 2	1	
880	Special service journal				See **2.4.7. SPECIAL SERVICE JOURNAL**.
881	Journal 2 list				See **2.4.7.3. PRINTOUT EXAMPLE**.
882	Journal 3 list				See **2.4.7.3. PRINTOUT EXAMPLE**.
890	TEL/FAX 1st ring back tone	1:ON 2:OFF	1, 2	1	Selects whether the TEL/FAX 1st ring back tone is ON or OFF in the TEL/FAX mode.
895	TEL/FAX mode receiving mode setting after bell time out	1:TAX 2:FAX	1, 2	2	--------

2.4.5. SERVICE MODE SETTINGS (Example of a printed out list)

```
【 Service Daten Liste 】

501 Pausenzeit              =  030*100ms        [001...600]*100ms
502 Flashdauer              =  08*10ms          [01...99]*10ms
503 Impulswahlrate          =  10pps            [1=10     2=20]pps
511 VOX Sense               =  HIGH             [1=HIGH   2=LOW]sec
520 CED Frequenz            =  2100Hz           [1=2100   2=1100]Hz
521 Intl. Modus             =  Aus              [1=Ein    2=Aus]
522 Bereitschaftsmodus      =  Ein              [1=Ein    2=Aus]
523 RX Equal.               =  0.0Km            [1=0.0    2=1.8   3=3.6   4=7.2]Km
524 TX Equal.               =  0.0Km            [1=0.0    2=1.8   3=3.6   4=7.2]Km
546 Amtsflashzeit           =  20*10ms          [01...99]*10ms
853 Oberer Druckrand        =  5                [1...9]
854 Linker Druckrand        =  5                [1...8]

【 Spezielle Service Einstellungen 】

552   553   559   570   571   572   573   580   590   591   592   593   594
  2     1     1     1    11   060    10     1    11   060     2     1     1

595   596   598   602   624   717   718   719   721   722   724   745   763
  2    10    44     1     1     1     1     1     2     1     1     1     3

771   775   861   890   895
  1     2     1     1     2
```

Note:

The above values are default.

```
【 HISTORY 】

1. DATE
   01 Ene. 1998 00:00
   TIME=00000 HOURS
2. KEY OPERATION
   1ST. 50:
   04 01 04 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
   00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
   LAST 50:
   00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
   00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
3. NUMERO OF COPY
   =00000
4. NUMERO OF RX
   =00000
5. NUMERO OF TX
   =00000

YOUR LOGO
YOUR TELEFONICO NUMERO
```

Note:

Refer to **2.4.6. OTHER**.

2.4.6. OTHER

[HISTORY]

No.	Display	Function
1	DATE	Date and time which are set by a user for the first time after purchase. TIME is the expiration from the first power on after purchase.
2	KEY OPERATION	Indicate 2-digit codes. 1st.50: History of the key operation from 1st to 50th after purchase. Last.50: History of the last 50 key operations.
3	NUMBER of COPY	The number of pages copied.
4	NUMBER of RX	The number of pages received.
5	NUMBER of TX	The number of pages sent.

2.4.7. SPECIAL SERVICE JOURNAL

The journal shown below is printed by pressing [MENU] and then #9000*880 [START]. It can be taken out by remote control (together with the existing journal).[Refer to **2.3.3.3.2. Remote programing**]

JOURNAL 2

The journal 2 displays the additional detailed information about the last 35 communications.Only the No. is the same information as journal on user mode. (Refer to **2.3.3.3.2. Remote programing**.)

Descriptions of individual items.

1. **RCV. MODE**

   Indicates which receive mode the unit was in when the unit received a fax message. This information is also displayed when the unit transmitted a fax messege.

2. **SPEED**

   Indicates speed of the communication. If multiple pages are transmitted or received, it indicates the last page´s communication speed. In the case of communication error, "?" is displayed in this field.

3. **RESOLUTION**

   Indicates resolution at the communication. If multiple pages are transmitted or received, it indicates the last page´s resolution. In the case of communication error, "?" is displayed in this field.

4. **RX-TRIG. (CNT.)**

   Indicates the trigger that causes the unit to switch to the fax receive mode. The available options are listed in the table below. The values in parentheses indicate how many times the trigger has been used. (For example, "00003" means three times.)

No.	Display	Function
1	FAX MODE	Means the unit received a fax message in the FAX mode. In this case, the valnes in the parentheses are not displayed.
2	MAN RCV	Means the unit received a fax message by manual operetion.
3	FRN RCV	Means the unit received a fax message by friendly signal detection.
4	CNG OGM	Means the unit detected the CNG while it was sending the Dummy Ring Back Tone in the TEL/FA mode or answering a call in the EXT-TAM mode. OR Means the unit detected the CNG while it was sending OMG in the ANS/FAX mode.
5	CNG ICM	Means the unit detected the CNG while it was recording ICM in the ANS/FAX mode.
6	VOX	Means the unit detected silence or no voice.
7	RMT DTMF	Means the unit detected DTMF (Remote Fax activation code) entered remotely.
8	PAL DTMF	Means the unit detected DTMF (Remote Fax activation code) entered by a para-Tel.
9	TURN-ON	Means the unit started to receive after the expiry of 15-time rings. (Remote Turn On: Service Code #573)
10	TIME OUT	Means the unit started to receive after Ring Time Out in the EXT-TAM or TEL/FAX mode.
11	IDENT	Means the unit detected Ring Detection.

5. **ERROR→MEMORY**

Indicates the reason why the unit received a fax message in memory. In the printing example below, a "paper out" error occurred and reception directly to the fax memory took place.

NO RESPONSE DISAPPEARED ON JOURNAL

The NO RESPONSE DISAPPEARED ON JOURNAL displays the information about the last 10 communications terminated with No Response. (Some of the communication terminated with No Response were not displayed in the JOURNAL.)

JOURNAL2

(Nr.) NO.	① (Empf. Modus) RCV. MODE	② (Geschw) SPEED	③ (Aufl) RESOLUTION	④ (Empf. Auslösung) RX-TRIG. (CNT)	⑤ (Speicherempf.) ERROR-> MEMORY
01	TEL/FAX	9600BPS	STD.	CNG OGM (00001)	
02	TEL	9600BPS	STD.		
03	EXT. TAM	9600BPS	STD.	RMT DTMF(00001)	
04	FAX	9600BPS	STD.	FAX MOD	
05	TEL	9600BPS	STD.	MAN RCV (00002)	
06	TEL	9600BPS	STD.	MAN RCV (00003)	
07	TEL	?	?	MAN RCV (00004)	
08	FAX	9600BPS	STD.	FAX MOD	
09	FAX	9600BPS	S-FINE.	FAX MOD	
10	EXT. TAM	9600BPS	STD.	CNG OGM (00002)	
11	EXT. TAM	9600BPS	FINE.	TIMEOUT (00013)	
12	TEL/FAX	7200BPS	STD.	CNG OGM (00003)	
13	TEL/FAX	4800BPS	STD.	CNG OGM (00004)	
14	FAX	2400BPS	S-FINE.	FAX MOD	
15	FAX	?	?	FAX MOD	
16	FAX	?	?	FAX MOD	
17	TEL/FAX	?	?	MAN RCV (00005)	
18	TEL	?	?	MAN RCV (00006)	
19	TEL	?	?	MAN RCV (00007)	
20	TEL	?	?	MAN RCV (00008)	
21	TEL	?	?	MAN RCV (00009)	
22	TEL	?	?	MAN RCV (00010)	
23	TEL	?	?	MAN RCV (00011)	
24	TEL	?	?	MAN RCV (00012)	
25	TEL	?	?	MAN RCV (00013)	
26	TEL	?	?	MAN RCV (00014)	
27	TEL	?	?	MAN RCV (00015)	
28	TEL	?	?	MAN RCV (00016)	
29	TEL	?	?	MAN RCV (00017)	
30	TEL	?	?	MAN RCV (00018)	
31	TEL	?	?	MAN RCV (00019)	
32	TEL	?	?	MAN RCV (00020)	
33	TEL	?	?	MAN RCV (00021)	
34	TEL	?	?	MAN RCV (00022)	
35	FAX	9600BPS	STD.	FAX MOD	PAPER OUT

NO RESPONSE DISAPPEARED ON JOURNAL

(Nr.) NO.	(Startzeit) START TIME	(Empf. Modus) RX MODE	(Empf. Auslösung) RX-TRIG. (CNT.)
01	Jan. 01 12:09AM	TEL/FAX	TIMEOUT (00003)
02	Jan. 01 01:15AM	TEL/FAX	TIMEOUT (00004)
03	Jan. 01 01:16AM	TEL/FAX	TIMEOUT (00005)
04	Jan. 01 01:17AM	TEL/FAX	TIMEOUT (00006)
05	Jan. 01 01:18AM	TEL/FAX	TIMEOUT (00007)
06	Jan. 01 01:21AM	TEL/FAX	TIMEOUT (00008)
07	Jan. 01 01:22AM	TEL/FAX	TIMEOUT (00009)
08	Jan. 01 01:23AM	TEL/FAX	TIMEOUT (00010)
09	Jan. 01 01:25AM	TEL/FAX	TIMEOUT (00011)

Note:

Words in brackets ( ) are German. A translated virsion for each market is available with this model series.

JOURNAL 3

Mar. 25 1998 01:58PM

NO.	ENCODE	MSLT	EQM(RX)	ERROR LINE(RX)	MAKER CODE
01	MR	10msec	007A	00000	0E
02	MR	20msec	016B	00000	00
03	MH	10msec	0000	00000	00
04	MR	20msec	019B	00003	00
05	MR	20msec	0156	00011	00
06	MR	20msec	0113	00000	00
07	MR	5msec	0000	00000	79
08	MR	5msec	0000	00000	79
09	MR	0msec	0000	00000	19
10	MR	20msec	0100	00000	00
11	MR	10msec	0073	00000	0E
12	MR	20msec	012B	00000	00
13	MH	20msec	0000	00000	79
14	MH	20msec	0000	00000	00
15	MH	20msec	0000	00000	00
16	MH	20msec	0000	00000	00
17	MR	5msec	0000	00000	79
18	MR	10msec	00AB	00004	0E
19	MR	20msec	0124	00000	00
20	MR	20msec	0000	00000	00
21	MR	20msec	0000	00000	00
22	MR	20msec	0135	00000	00
23	MR	20msec	0000	00000	00
24	MR	20msec	01BC	00000	00
25	MR	20msec	01AC	00000	00
26	MR	20msec	020F	00000	00
27	MR	10msec	0000	00000	0E
28	MR	20msec	01DF	00000	00
29	MR	20msec	01EA	00000	00
30	MR	20msec	00CD	00000	00
31	MR	20msec	02F8	00000	0E
32	MR	10msec	04F8	00000	0E
33	MR	10msec	0000	00000	00
34	MR	20msec	03B6	00000	0E
35	MH	20msec	00E0	00000	00

2.5. TEST FUNCTIONS

The codes listed below can be used to perform simple checks of some of the unit's functions. When complaints are received from customers, they provide an effective tool for identifying the locations and causes of malfunctions.

Test mode	Type of Mode	Code □□□ Operation after code input	Function
MOTOR TEST	Service Mode	5 5 6 START	Rotate the transmission and reception motors to check the operation of the motors. 00 ..... Stop 10 ..... Forward RX motor 01 ..... Forward TX motor 11 ..... Forward RX and TX motor 20 ..... Backward RX motor 02 ..... Backward TX motor 22 ..... Backward RX and TX motor •Press the STOP button to quit.
MODEM TEST	Service Mode	5 5 4 START	First, make the handset OFF-HOOK and then you can enter this Test Mode.Each time you press the start key, each of the signals will be heard in the following order from the handset. 1) OFF → 2) 14400bps → 3) 12000bps → 4) 9600bps (V17) → 5) 7200bps (V17) → 6) 9600bps → 7) 7200bps → 8) 4800bps → 9) 2400bps → 10) 300bps →11) 2100Hz →12) 1100Hz
ROM CHECK	Service Mode	5 5 1 START	Indicate the version and check sum of the ROM.
SCAN CHECK	Service Mode	5 5 5 START	Turn on the LEDs of the CCD unit and operate the read system. This is also used to adjust the CCD.
LCD CHECK	Service Mode	5 5 8 START	Check the LCD indication. Illuminate all dots to check if they are normal.
DTMF SINGLE TEST	Service Mode	5 5 2 1..On 2..Off	Output DTMF as single tones. Used to check the frequencies of the individual DTMF tones. Refer to **2.5.1 DTMF Single Tone Transmit Select**.
LED TEST	Service Mode	5 5 7 START	All LEDs above the operation panel board flashes on and off, or is illuminated.
KEY CHECK	Service Mode	5 6 1 START { any key }	Check the operation button. Indicate the button code at LCD while the button is pressed. Refer to **2.5.2 Button Code Table**.
FACTORY SET	Service Mode	5 5 0 START	Clear the memory in which the user can store data.
CCD AUTO POSITION ADJUSTMENT	Service Mode	5 6 4 START	Used only at the factory.
PRINTER FEED TEST	Service Mode	8 5 1 START	Mechanical check.
PRINT TEST PATTERN	Service Mode	8 5 2 0 START	Print out the test pattern. Used chiefly at the factory to test print quality. Can select 1~4. (See pages **2.5.3 PRINT TEST PATTERN**.)
DIGITAL SPEAKERPHONE RX &TX XHECK	Service Mode	8 4 1 SPEAKERPHONE	Refer to **2.3.3.5.1. Digital Speakerphone**.
RS 232C TEST	Service Mode	8 7 0 START	Communication test for RS-232C serial port. (Refer to **2.3.3.4.3. RS-232C serial communication**.)

Test mode	Type of Mode	• Code □□□ • Operation after code input.	Function
SENSOR CHECK & VOX CHECK	Service Mode	0 1 5 START	After entering this mode, by operating the sensor levers, etc. Useing your hands, each sensor and SW display above the LCD will go ON/OFF. For each sensor's thermal head operation, refer to **6.5. SENSOR AND SWITCHES**. LCD display Do Sn Co Pf Pl Pt Ri Vx Do: Document set sensor: Paper inserted. Do turns on when a document is inserted. Sn: Read position sensor: At the read position. Sn turns on when the front cover is opened and the sensor lever is pressed directly. Co: Cover open sensor: Cover open. Co turns on and off when the front cover is opened and closed. Pf: Paper full sensor: Sensor on. Pf turns on when the sensor lever is pressed directly via the lower cabinet jam release window. Pl: Paper set switch: Sensor on. Pl turns on and off when the cassette lock lever is pushed down and up. Pt: Paper top sensor: Sensor on. Pt turns on when the front cover is opened and the sensor lever is pressed directly. Ri: Film and sensor: Sensor on. Ri turns on and off when the film end sensor gear is turned. Vx: Vox signal: Detection signal for the tone on the line. Turns on when there is a tone signal on the line.

Note:

The numbers in boxes (XXX) indicate the keys to be input for the various test modes.

2.5.1. DTMF SIGNAL TONE TRANSMIT SELECT

When set to ON (=1), the 12 keys and transmission frequencies are as shown.

key	High Frequency (Hz)	Key	Low Frequency (Hz)
“1”	697	“5”	1209
“2”	770	“6”	1336
“3”	852	“7”	1477
“4”	941		

When set to OFF (=2), the 12 keys and transmission frequencies are as shown.

High (Hz) / Low (Hz)	1209	1336	1477
697	“1”	“2”	“3”
770	“4”	“5”	“6”
852	“7”	“8”	“9”
941	✳	“0”	“#”

Note:

After performing this check, do not fail to turn the setting off. Otherwise, it will not be possible to dial using DTMF.

2.5.2. BUTTON CODE TABLE

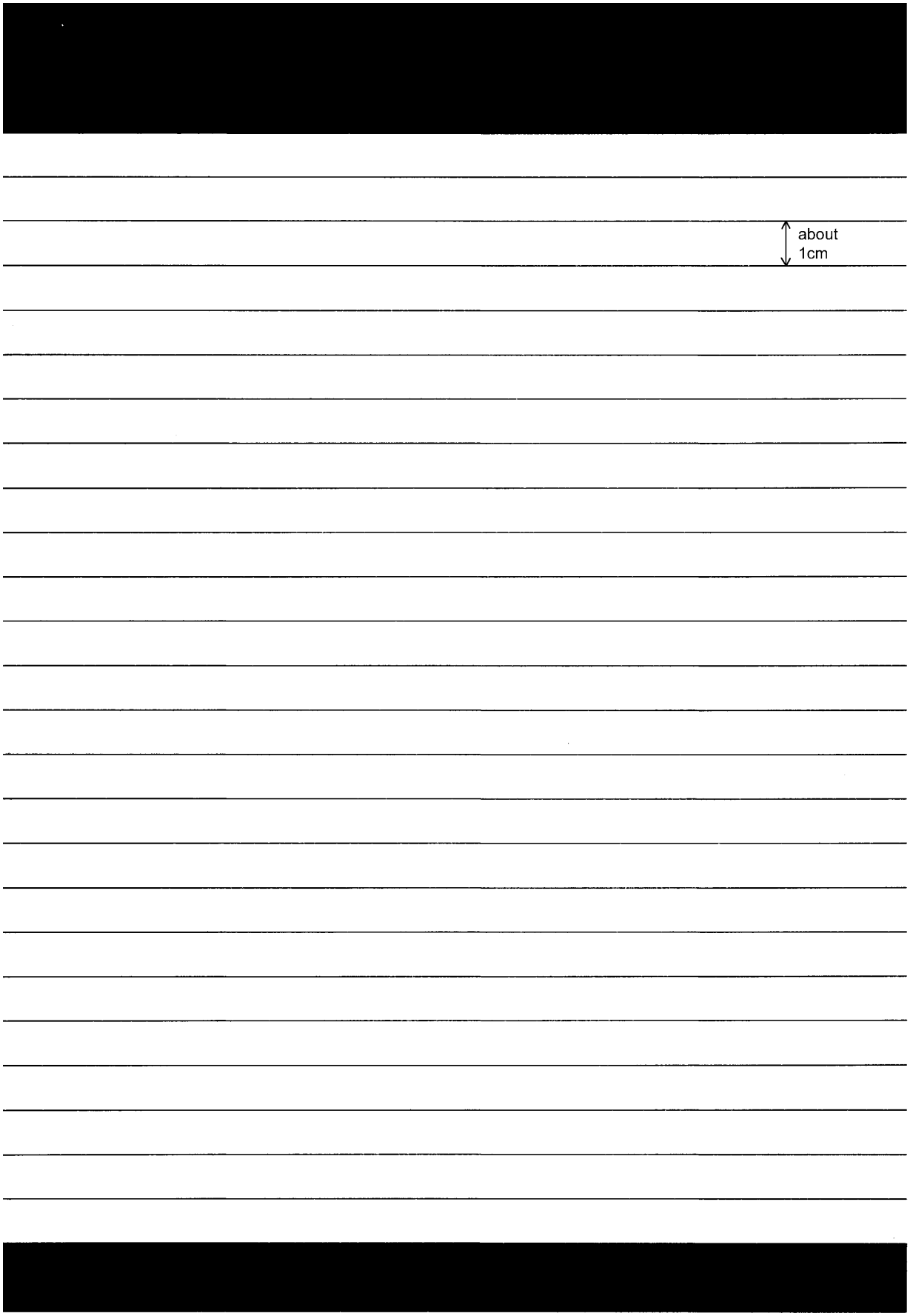
Code	Button Name	Code	Button Name	Code	Button Name
02	RESOLUTION	31	1	3D	REDIAL/PAUSE
04	START/COPY/SET	32	2	3E	FLASH
05	LOWER	33	3	64	STATION 1
07	FILM REMAINING	34	4	65	STATION 2
08	SP-PHONE	35	5	66	STATION 3
0A	MUTE	36	6	67	STATION 4
0C	RECEIVE MODE	37	7	68	STATION 5
20	MENU	38	8	69	STATION 6
22	HELP	39	9	6A	STATION 7
24	DIRECTORY	3A	0	6B	STATION 8
25	▲ VOLUME	3B	#	6C	STATION 9
26	▼ VOLUME	3C	✳	00	NO INPUT
				01	STOP

Note:

These codes (00, 01) are only for the data in the History Report.

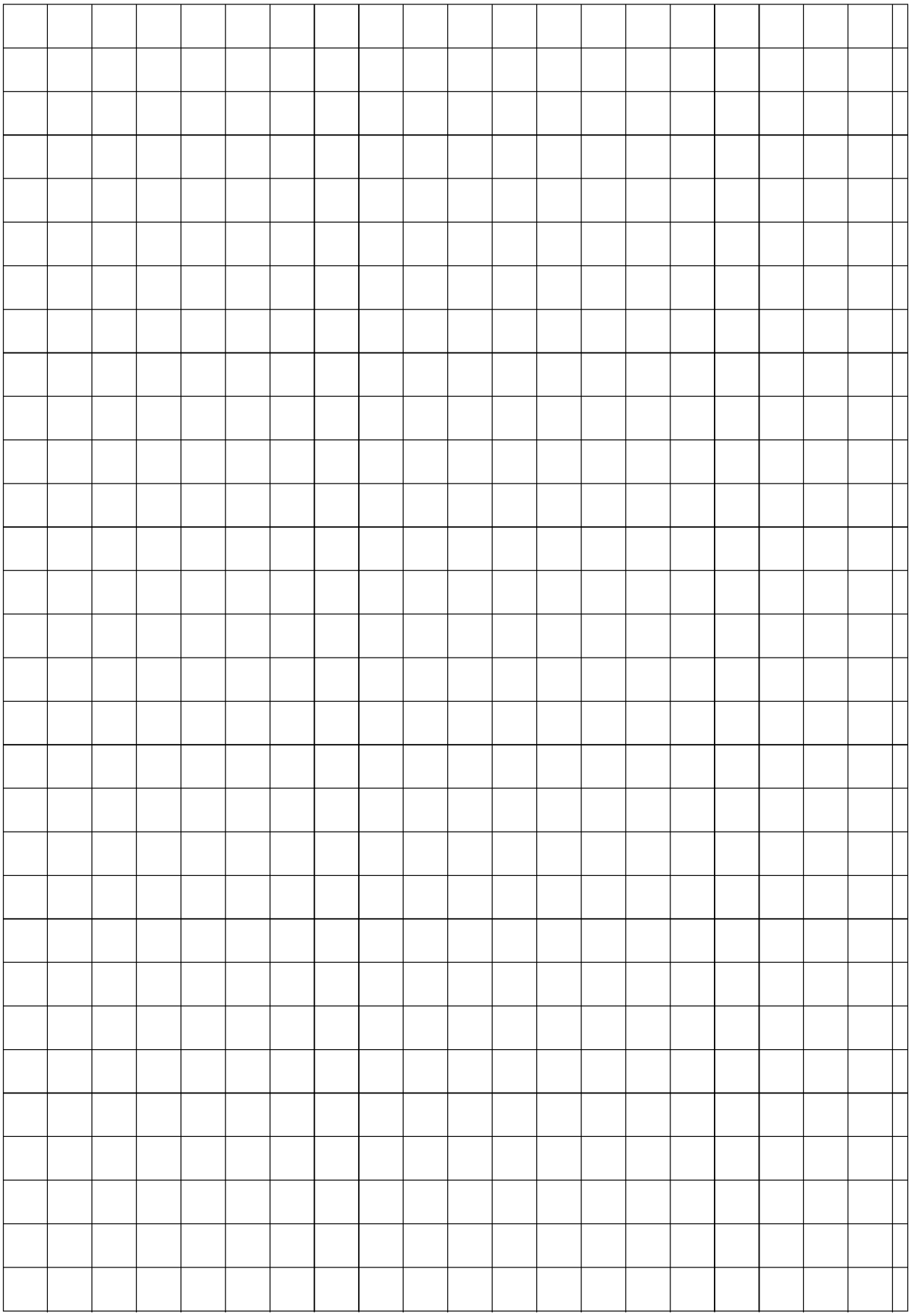
2.5.3. PRINT TEST PATTERN

1. **Platen feed**



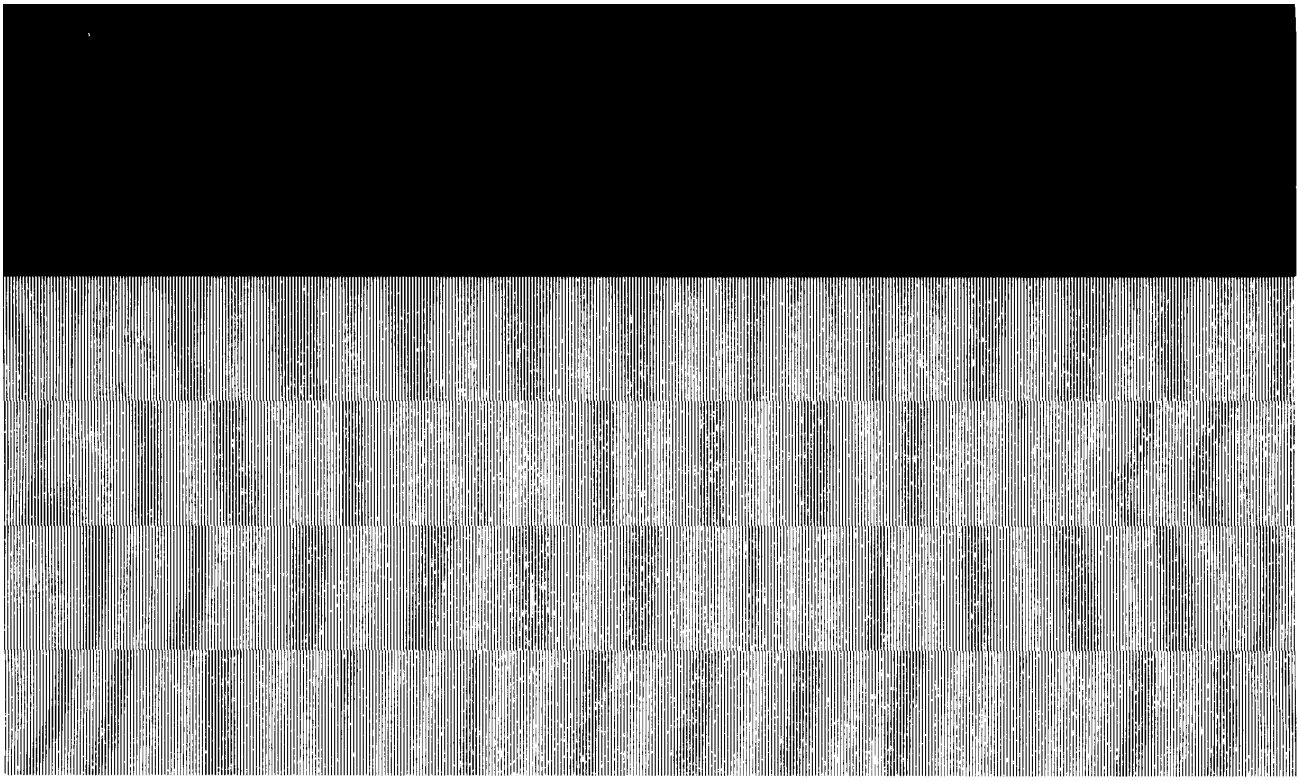
(Reference pattern)

2. **Left margin/Upper margin**



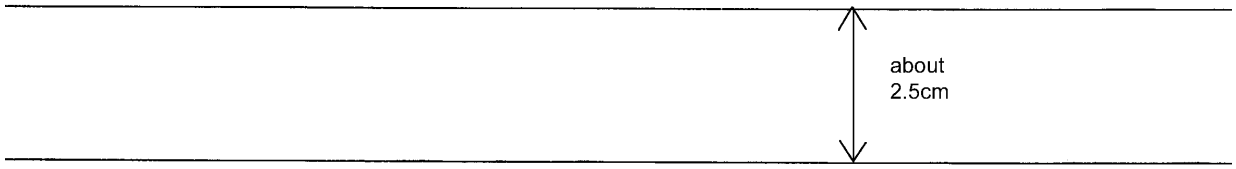
(Reference pattern)

3. **Head dot out**



(Reference pattern)

4. **Ribbon pull out**



(Reference pattern)

3 ADJUSTMENTS

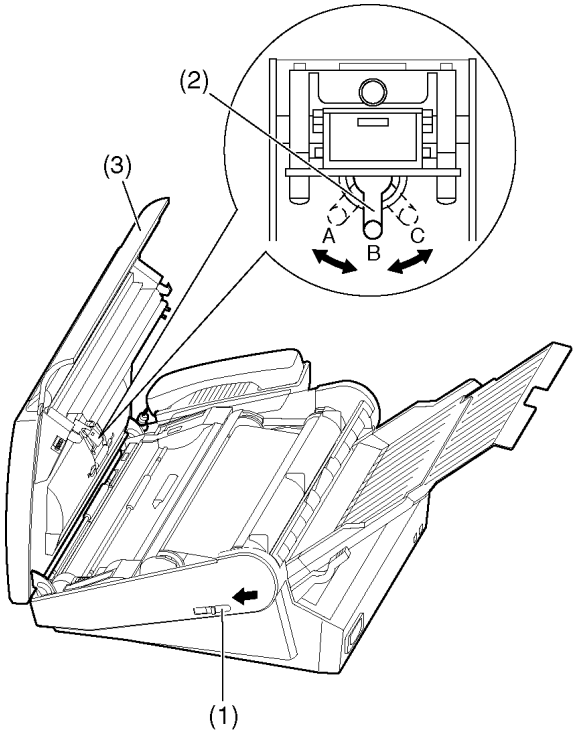
3.1. TABLE OF TEST EQUIPMENTS AND TOOLS

No.	Test Equipment and Jig Name	Jig No.
1	Oscilloscope	--------
2	CCD T00l	PFZZ1F780M
3	Extension Cord	PQZZ2K12Z, PQZZ8K18Z

3.2. ADJUSTING THE FEEDER PRESSURE

If misfeeding of document such as multiple feeding and no feeding occurs frequently, try to adjust the feeder pressure by following steps.

1. Slide the front cover open lever forwards to open the front cover.
2. Shift the position of the lever by using an instrument with a pointed end, like a clip or ball-point pen.
   Position A: Select this when documents are not fed.
   Position B: Standard position (pre-selected)
   Position C: Select this when documents are fed multiply.
3. Close the front cover securely by pushing down on both ends.



3.3. CCD ADJUSTMENTS

To obtain good print quality, perform the following adjustments after replacing the lens and/or CCD board.

3.3.1. PREPARATION

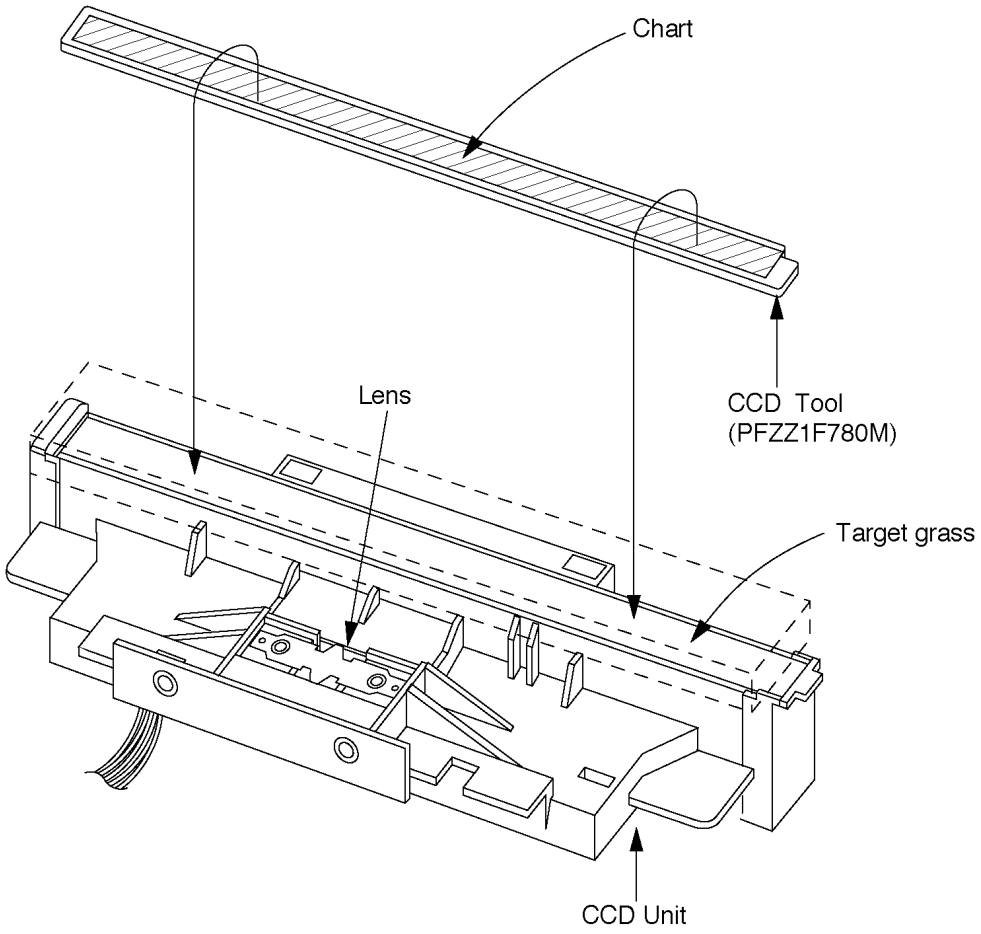
1. Remove the CCD unit from set. (Refer to **4. DISASSEMBLY INSTRUCTIONS**)
2. Make oscilloscope connections as shown in **LENS AND CCD READ POSITION ADJUSTMENT**.
3. Attach the CCD TOOL on the CCD unit.
4. Connect between CCD unit and digital board with extension cord (Part No. PQZZ8K18Z).
5. Connect between LED array and digital board with extension cord (Part No. PQZZ2K12Z).
6. Connect AC cord.
7. Press the MENU button.
8. Press the #,9,0,0,0, and ✳ buttons.
9. Press the 5,5 and 5 buttons.

Note:

1. Install the lens so that the marking (RED) is on its upper side.
2. Do not touch the glass face of the lens with bare hands.
3. If you have no instrument to repair the unit, trim off the chart on for **LENS AND CCD READ POSITION ADJUSTMENT**, then attach on the target glass (This is a temporary treatment. You should use CCD Tool for this time adjustment for proper repair.)

Cleaning

If the lens is dirty, clean it with a soft dry cloth.



Note:

Please adjust with covering topside of the lens by hands in order not to let in outdoor daylight.

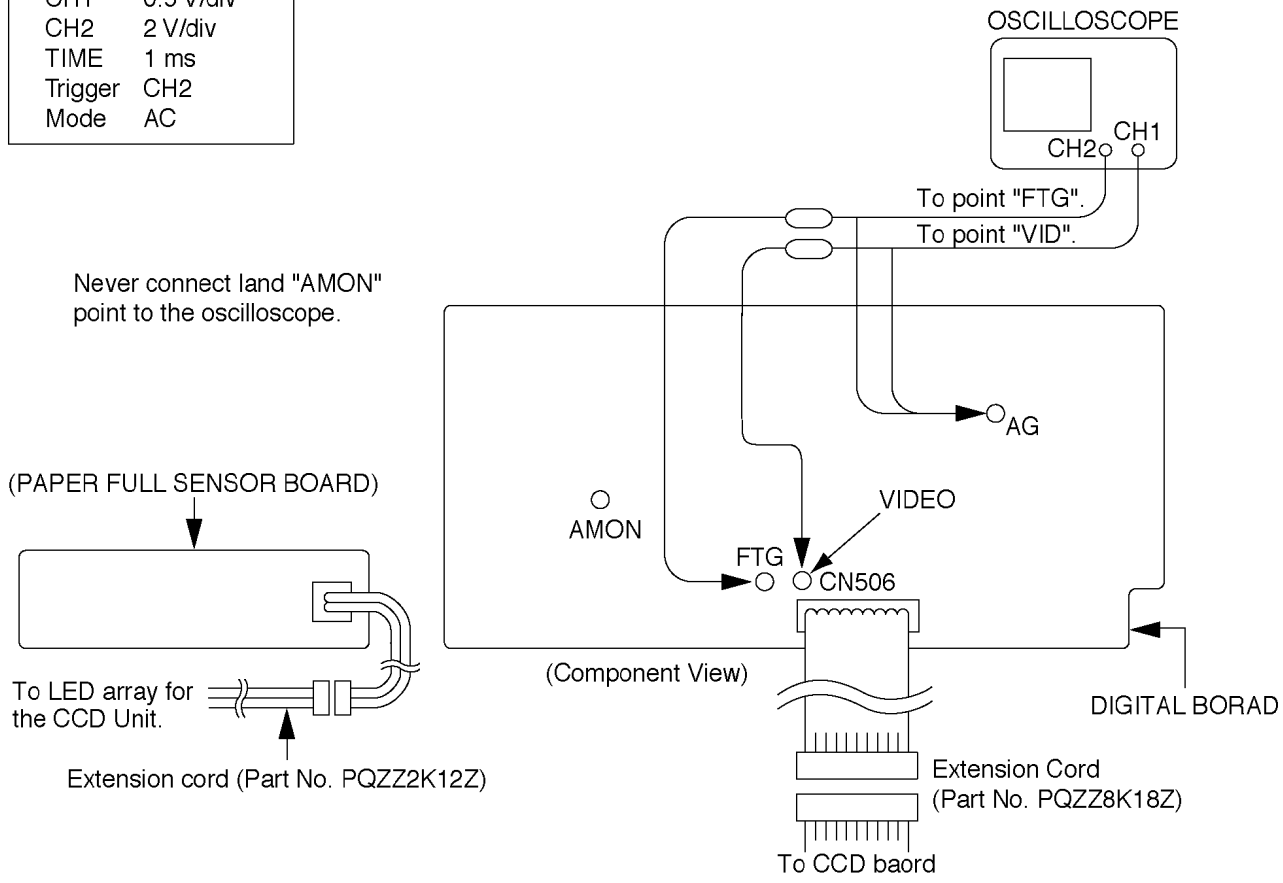
LENS AND CCD READ POSITION ADJUSTMENT

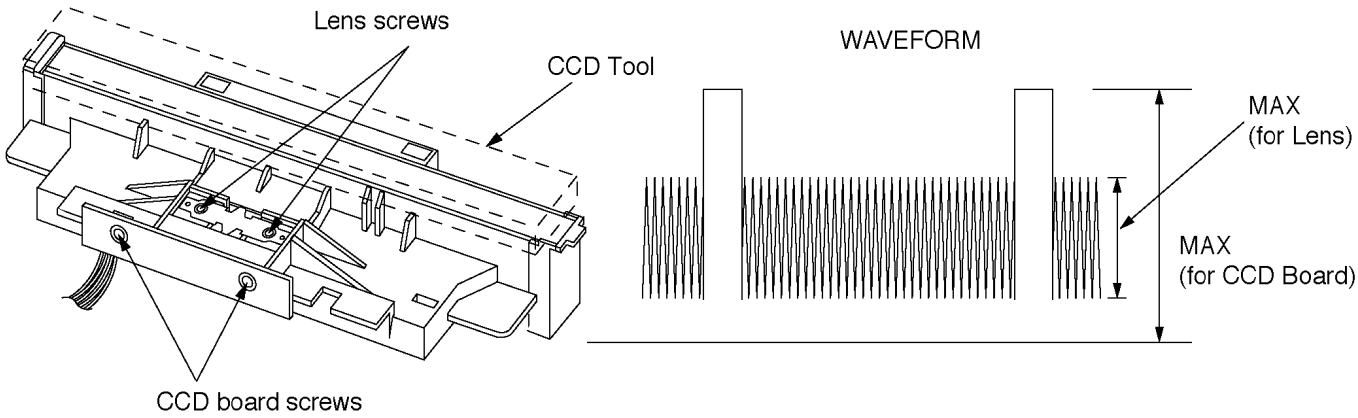
1. Loosen the lens fixing screws and CCD board screws.
2. Adjust the position of the lens and CCD board so that the waveform appears as shown in the figure below.
3. Tighten the lens screws and CCD board screws.

Note:

Make sure to observe the instructions in notes 1 and 2 on the preceding page.
Generally the lens is first temporarily secured and the CCD board is positioned.
Then the optimum lens position is selected.

Oscilloscope setting	
CH1	0.5 V/div
CH2	2 V/div
TIME	1 ms
Trigger	CH2
Mode	AC





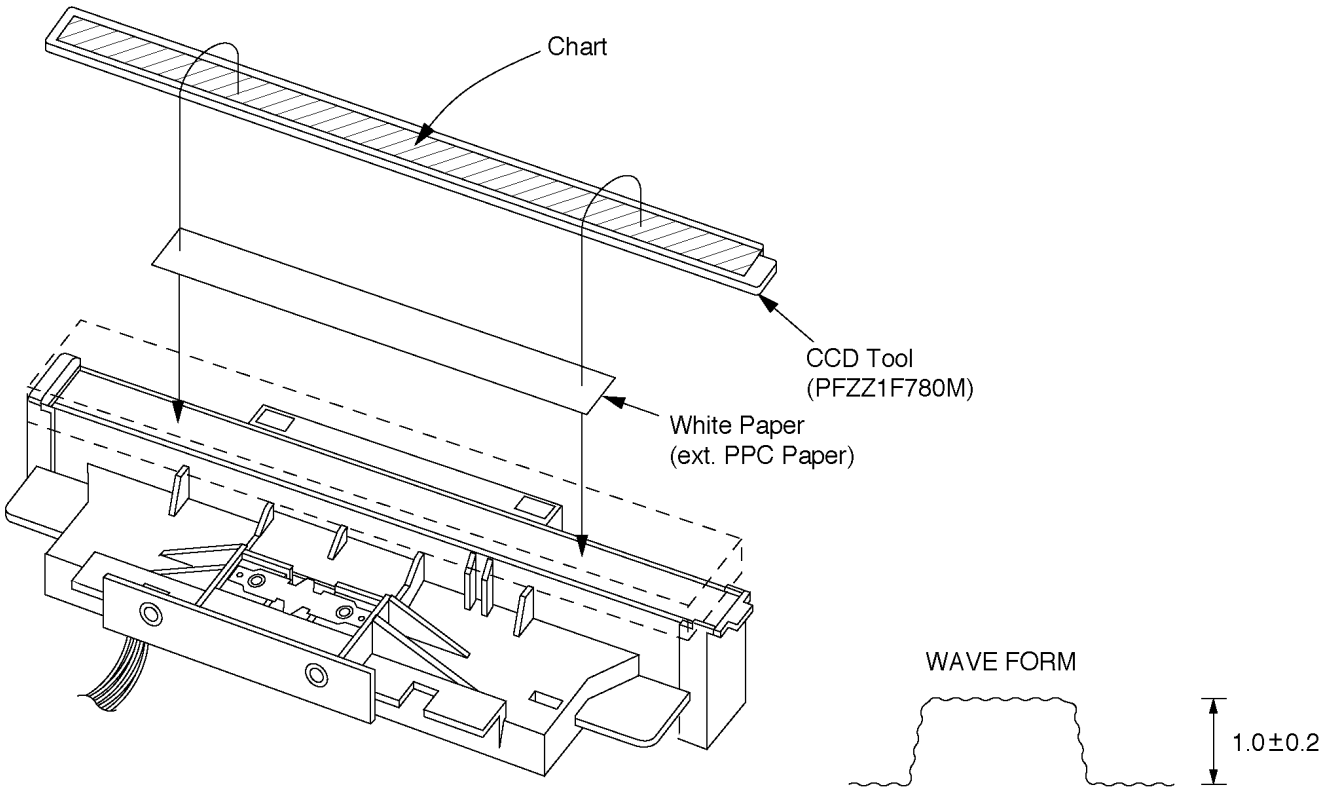
3.3.2. ADJUSTMENT

WHITE LEVEL ADJUSTMENT

1. Remove the CCD TOOL from CCD unit.
2. Attach the white paper on the CCD unit.
3. Attach the CCD TOOL on the CCD unit.
4. Adjust VR801 on the CCD board so that the waveform becomes 1.2± 0.2V.

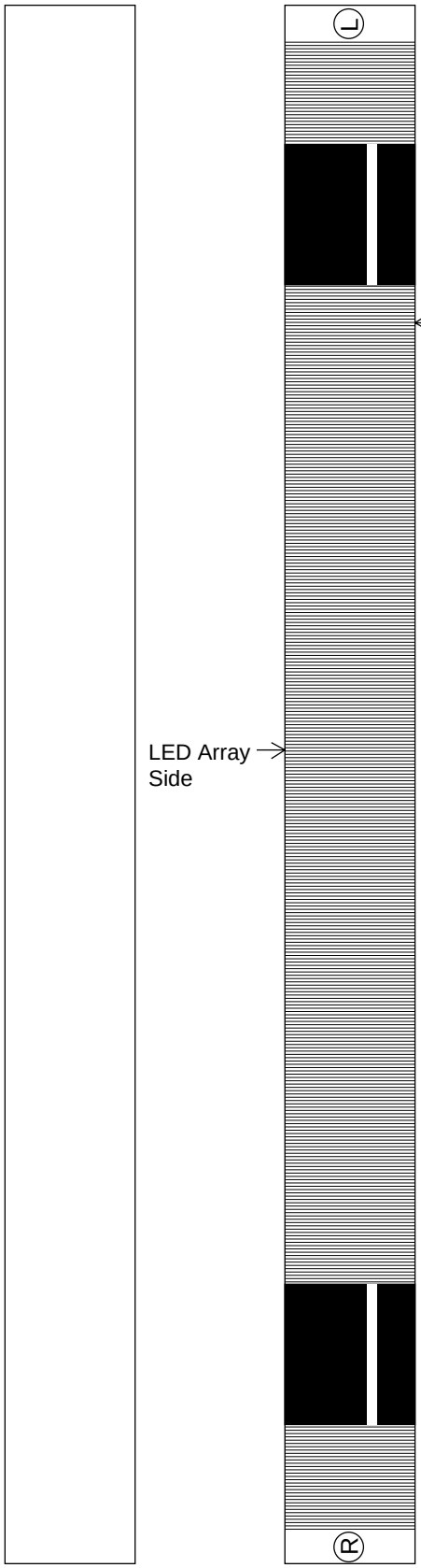
Note:

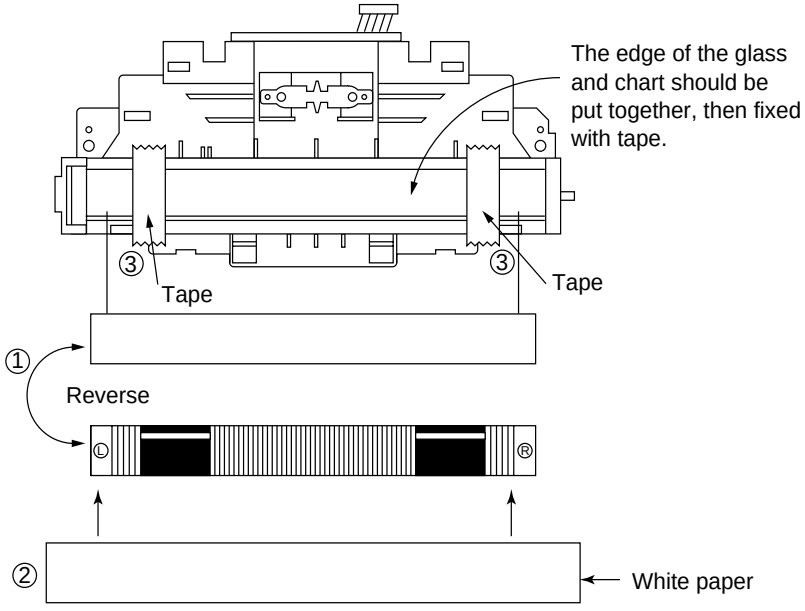
1. After the adjustment is finished, assemble the unit by reversing above procedure.
2. While making adjustments, cover the top of the lens with something (such as a thick piece of paper) to prevent light from entering.
3. If you have no instrument to repair, trim off the chart on next page, then attach on the target glass.
   (This is a temporary treatment. You should use CCD Tool for this time adjustment purpose, if you require an accurate repairment.)



(for white level adjustment)

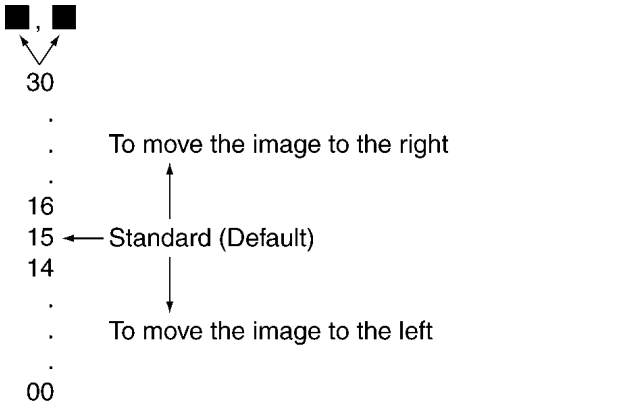
(for lens and CCD read position adjustment)





3.4. DOCUMENT READ START POSITION ADJUSTMENT

1. Connect AC cord.
2. Copy the document, and confirm the read start position of the document. Compare the printed result with the original document.
3. If get out of position, adjust the read position.
4. Press the MENU button.
5. Press the #, 9, 0, 0, 0, ✳ and 5, 6, 3 buttons.
6. Press the ■n, n■, SET and MENU buttons.

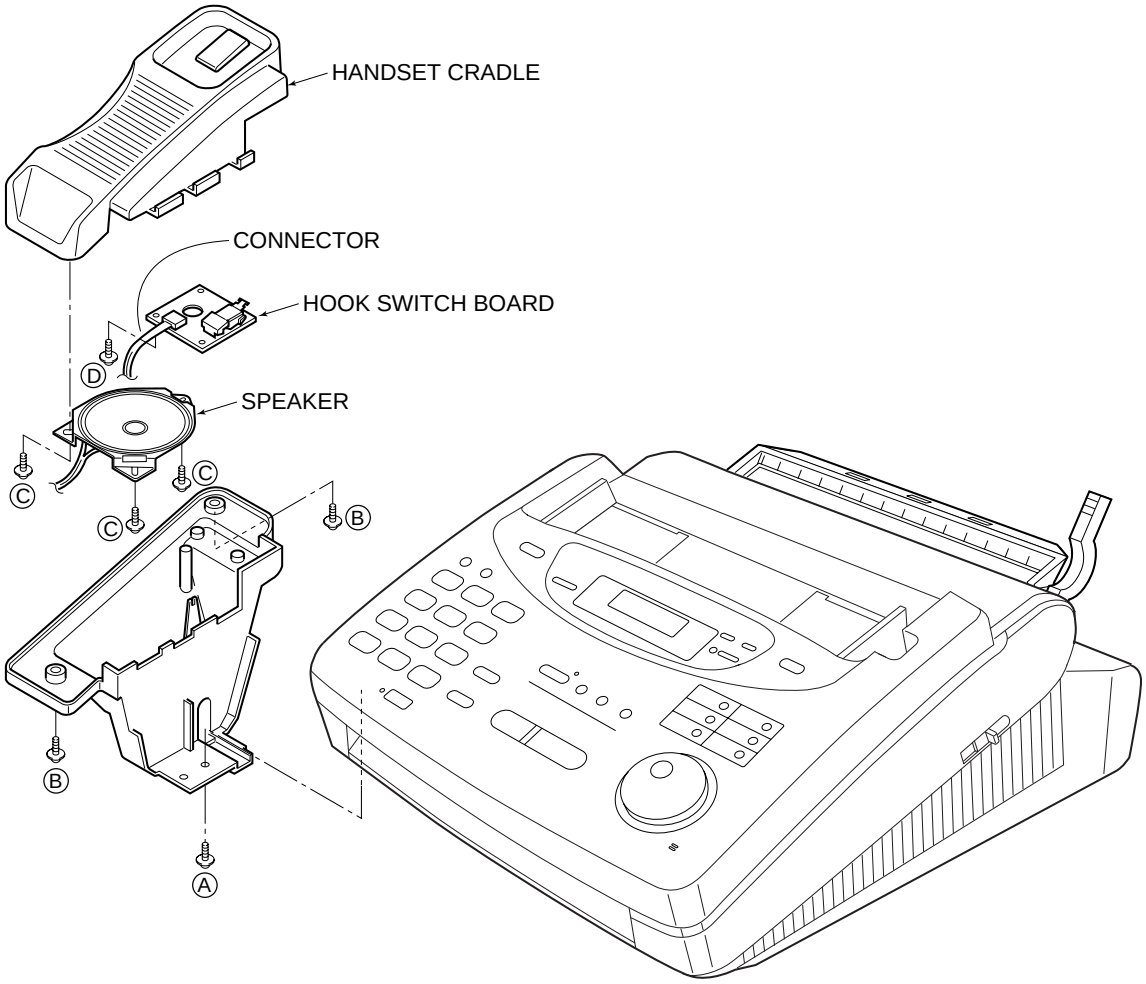


The read start position moves 1 mm in an increment.

4 DISASSEMBLY INSTRUCTIONS

Ref. No. 1	**HOW TO REMOVE THE HANDSET CRADLE, SPEAKER AND HOOK SWITCH BOARD**
Procedure 1	• Remove accessories such as the cassette tray and power cord before disassembling the unit.

1) Remove the 1 screw Ⓐ.
2) Remove the 2 screws Ⓑ.
3) Remove the handset cradle.
4) Remove the 3 screws Ⓒ.
5) Remove the speaker.
6) Remove the 1 screw Ⓓ.
7) Remove the connector.
8) Remove the hook switch board.



Ref. No. 2	
Procedure 2	

1) Push the front lid open lever in the direction of the arrow to the open the operation panel block.
2) Remove the arm. (See Fig. A)
3) Pull the both sides of the arms. (See Fig. B)
4) Remove the operation panel block.

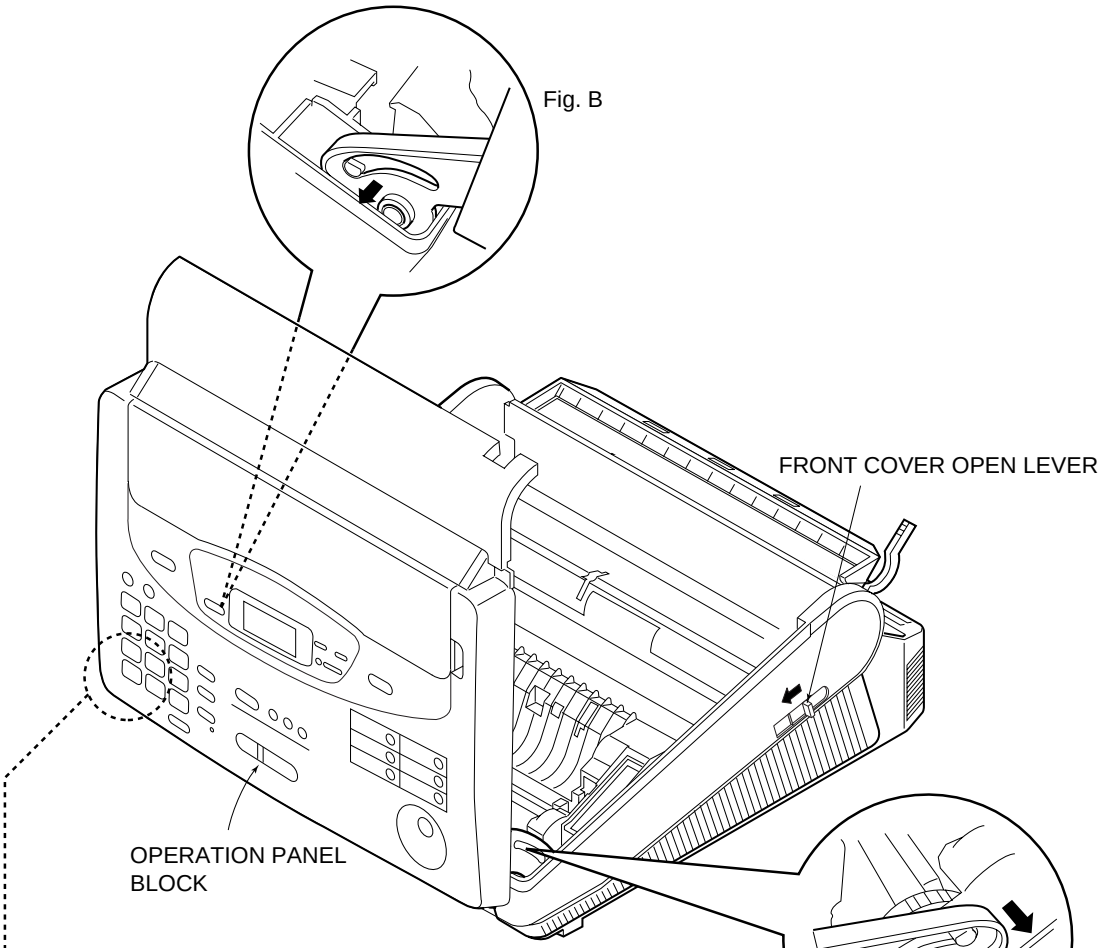


Fig. B

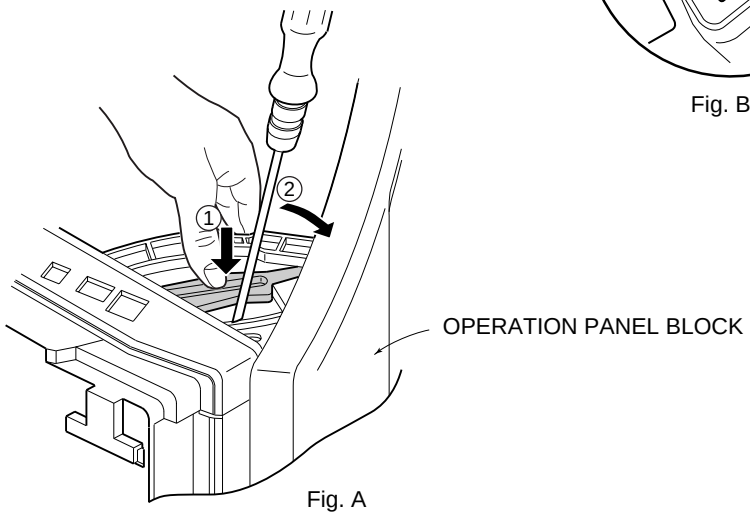
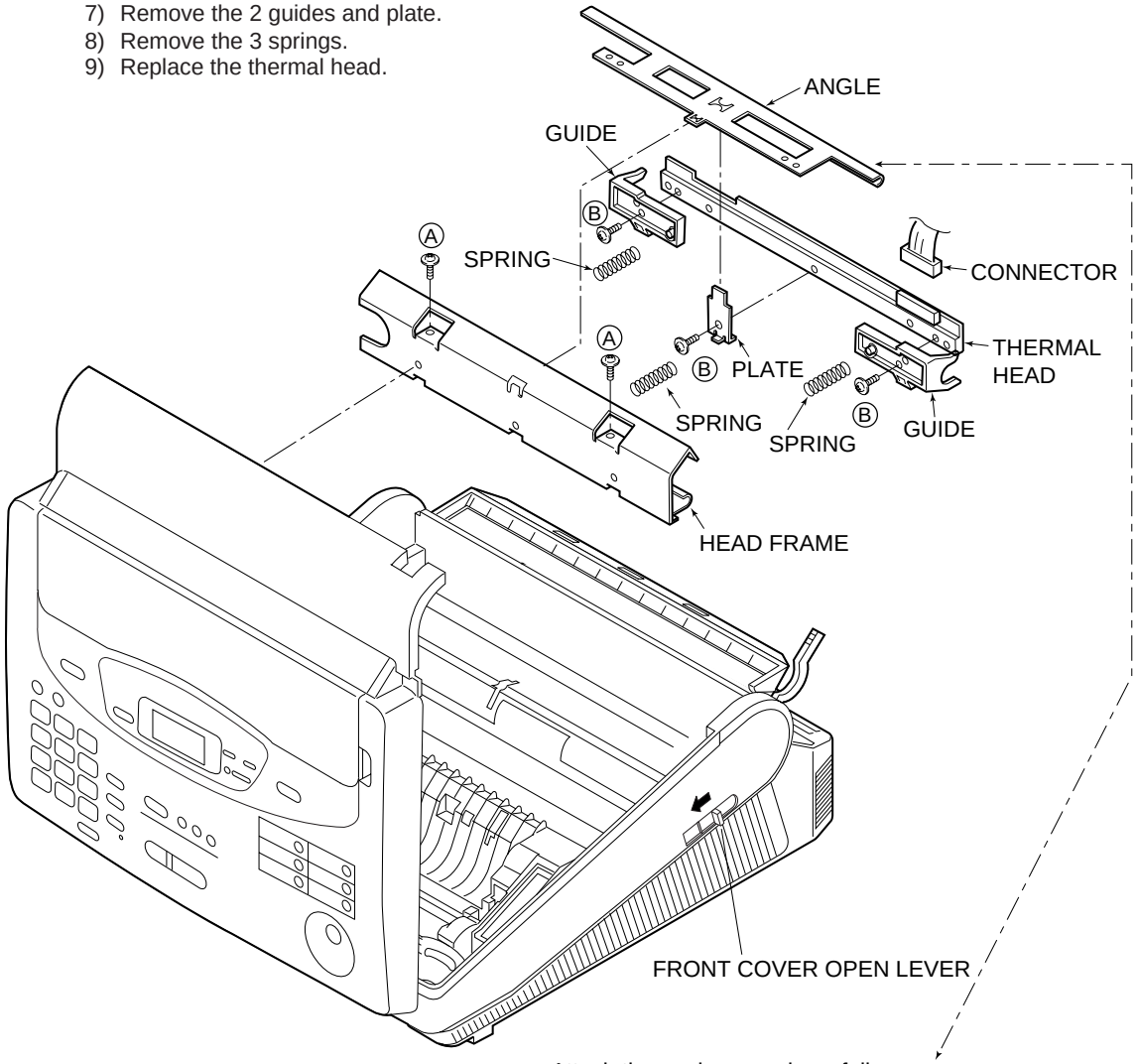


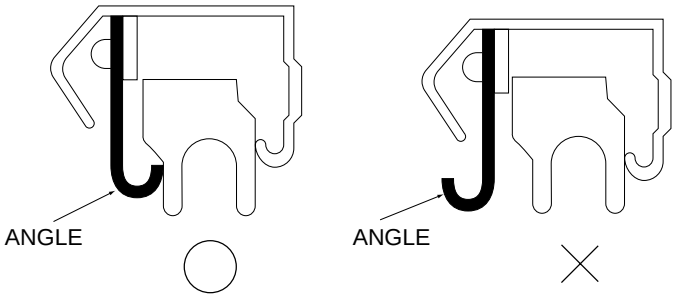
Fig. A

Ref. No. 3	**HOW TO REMOVE THE THERMAL HEAD**
Procedure 3	

1) Push the front lid open lever in the direction of the arrow to open the operation panel.
2) Remove the 2 screws Ⓐ.
3) Remove the thermal head block.
4) Remove the angle.
5) Pull out the connector.
6) Remove the 3 screws Ⓑ.
7) Remove the 2 guides and plate.
8) Remove the 3 springs.
9) Replace the thermal head.



Attach the angle properly as follows.

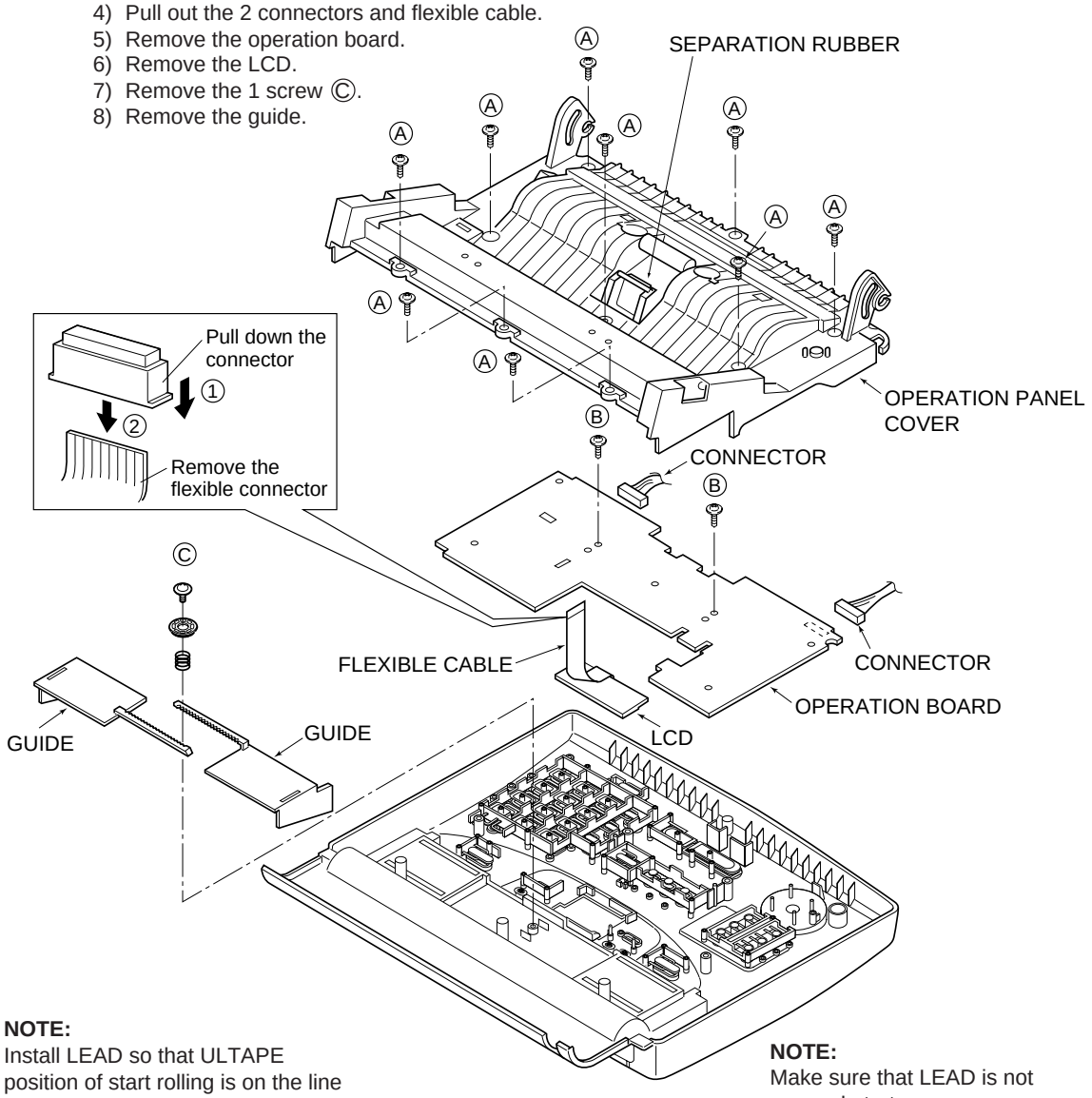


OK

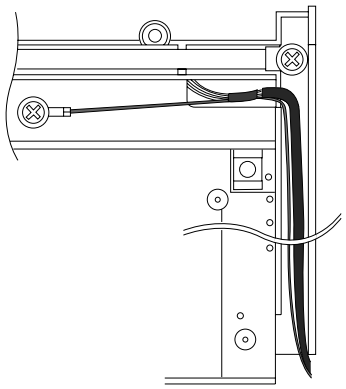
NG
(The film will tear.)

Ref. No. 4	**HOW TO REMOVE THE OPERATION BOARD, LCD AND DOCUMENT GUIDE**
Procedure 2→4	

1) Remove the 9 screws Ⓐ.
2) Remove the operation panel cover.
3) Remove the 2 screws Ⓑ.
4) Pull out the 2 connectors and flexible cable.
5) Remove the operation board.
6) Remove the LCD.
7) Remove the 1 screw Ⓒ.
8) Remove the guide.

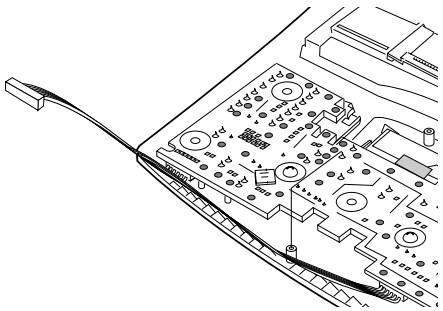


NOTE:
Install LEAD so that ULTAPE position of start rolling is on the line as following figure.



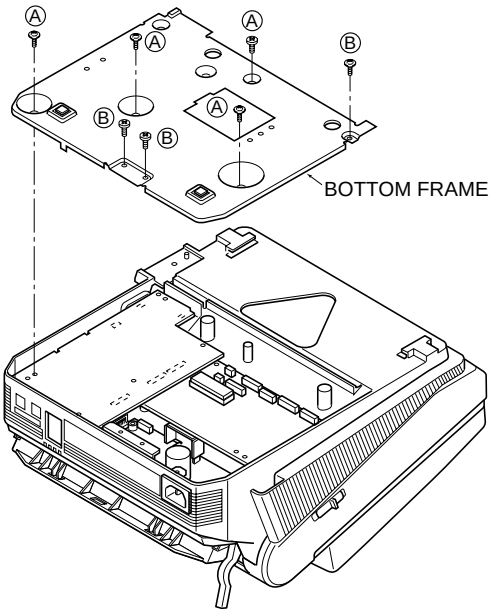
NOTE:
Make sure that LEAD is not on a substrate.

Don't hold LEAD between an operation panel and the substrate.



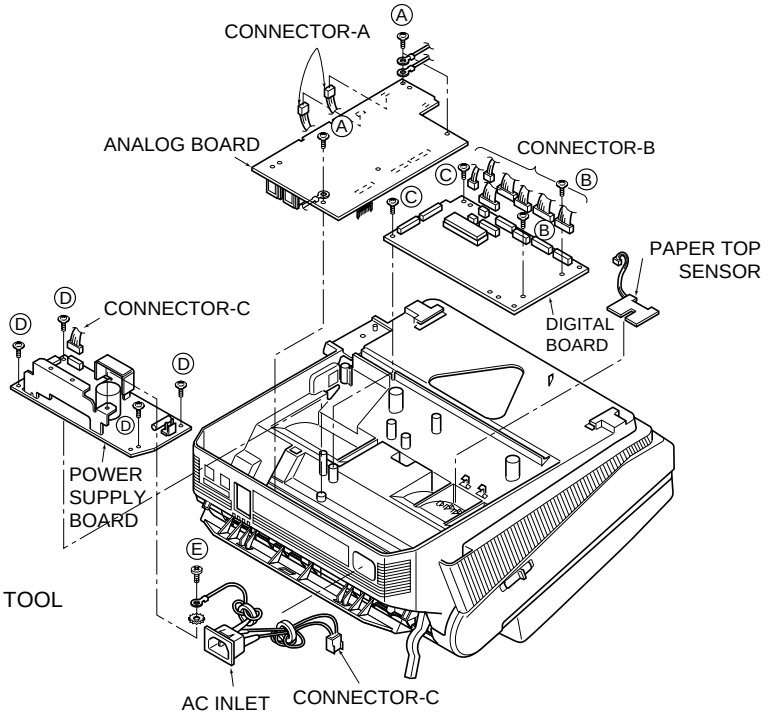
Ref. No. 5	**HOW TO REMOVE THE BOTTOM FRAME**
Procedure 5	

1) Remove the 4 screws Ⓐ.
2) Remove the 3 screws Ⓑ.
3) Remove the bottom frame.

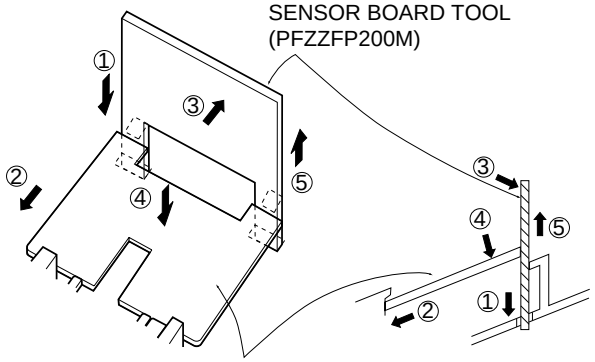


Ref. No. 6	**HOW TO REMOVE THE ANALOG, DIGITAL, POWER SUPPLY, PAPER TOP SENSOR BOARDS AND AC INLET**
Procedure 1→5→6	

1) Remove the 2 screws Ⓐ.
2) Remove the analog board.
3) Pull out the 2 connectors-A.
4) Remove the 7 connectors-B.
5) Remove the 2 screws Ⓑ.
6) Remove the 2 screws Ⓒ.
7) Remove the digital board.
8) Remove the 4 screws Ⓓ.
9) Remove the 1 screw Ⓔ.
10) Pull out the 2 connectors-C.
11) Remove the power supply board.
12) Remove the AC inlet.
13) Remove the paper top sensor board.



NOTE:
Use a sensor board tool when you set and remove a paper top sensor board .



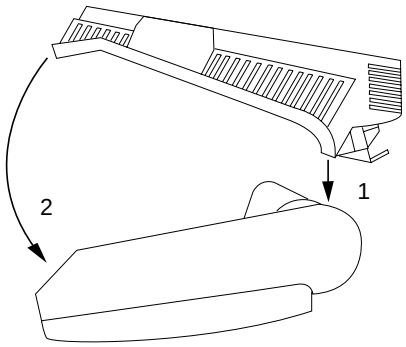
NOTE:
Refer to **[Wiring]**

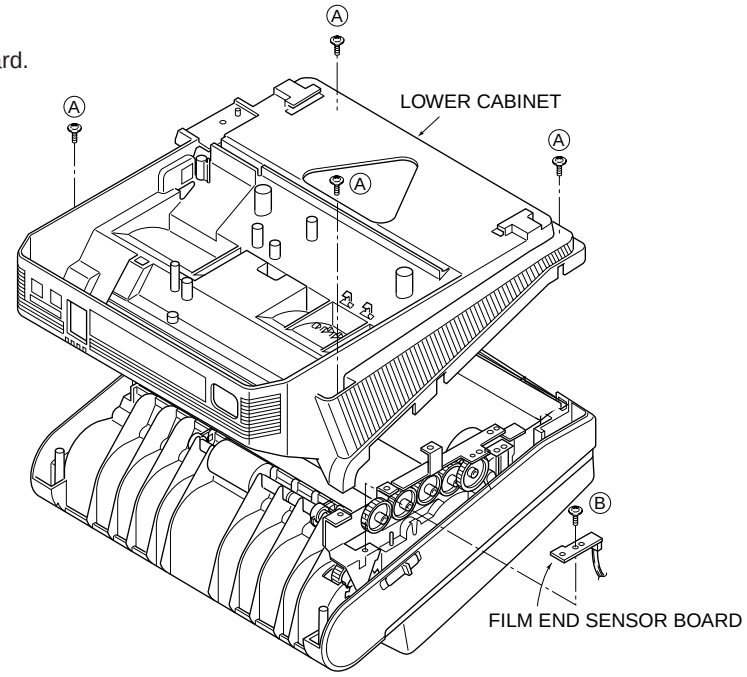
Ref. No. 7	**HOW TO REMOVE THE LOWER CABINET AND FILM END SENSOR BOARD**

Procedure
5→6→7

1) Remove the 4 screws Ⓐ.
2) Remove the lower cabinet.
3) Remove the 1 screw Ⓑ.
3) Remove the film end sensor board.

NOTE:
When you close a lower cabinet, insert back side first then set front side.



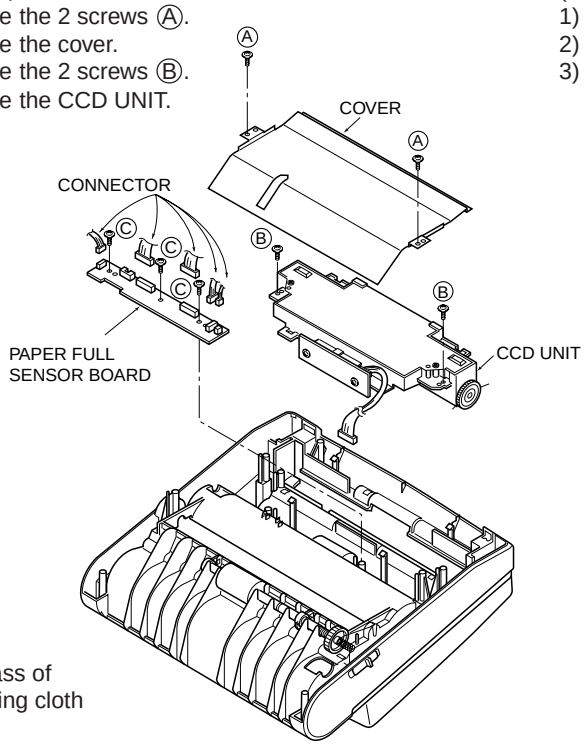


Ref. No. 8	**HOW TO REMOVE THE CCD UNIT AND PAPER FULL SENSOR BOARD**

Procedure
1→5→6→7→8

(CCD UNIT)
1) Remove the 2 screws Ⓐ.
2) Remove the cover.
3) Remove the 2 screws Ⓑ.
4) Remove the CCD UNIT.

(PAPER FULL SENSOR BOARD)
1) Pull out the 5 connectors.
2) Remove the 3 screws Ⓒ.
3) Remove the paper full sensor board.

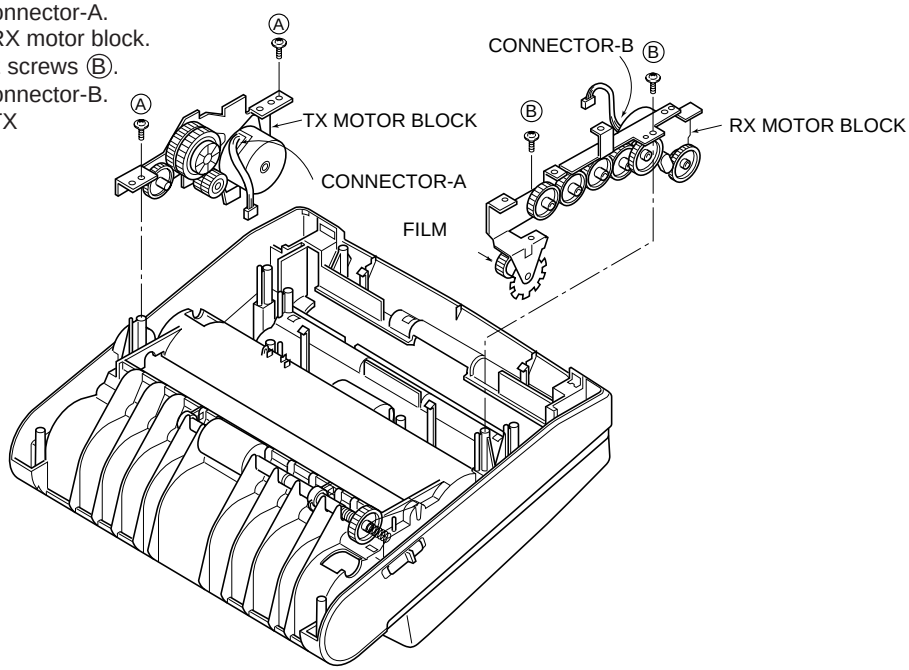


HOW TO CLEAN:
Clean the target glass of CCD unit with soaking cloth in alcohol.

Ref. No. 9	**HOW TO REMOVE THE MOTOR BLOCK**

Procedure 5→6→7→8→9

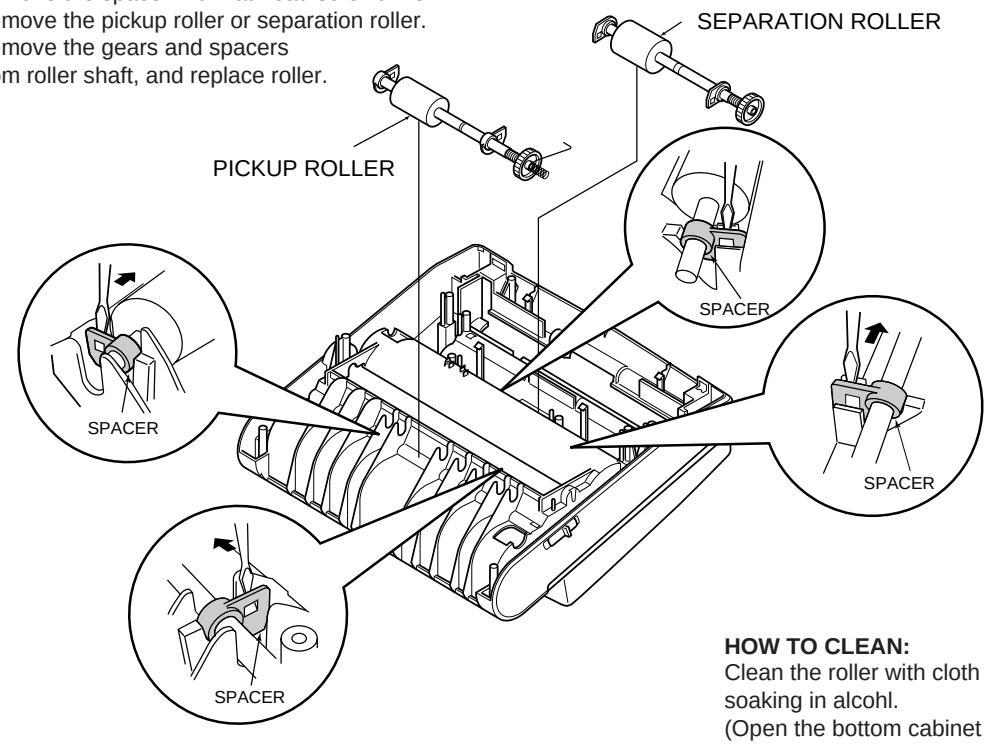
1) Remove the 2 screws Ⓐ.
2) Pull out the connector-A.
3) Remove the RX motor block.
4) Remove the 2 screws Ⓑ.
4) Pull out the connector-B.
6) Remove the TX motor block.



Ref. No. 10	**HOW TO REMOVE THE PICKUP AND SEPARATION ROLLERS**

Procedure 5→6→7→8→9→10

1) Remove the spacer with flat head screwdriver.
2) Remove the pickup roller or separation roller.
3) Remove the gears and spacers from roller shaft, and replace roller.

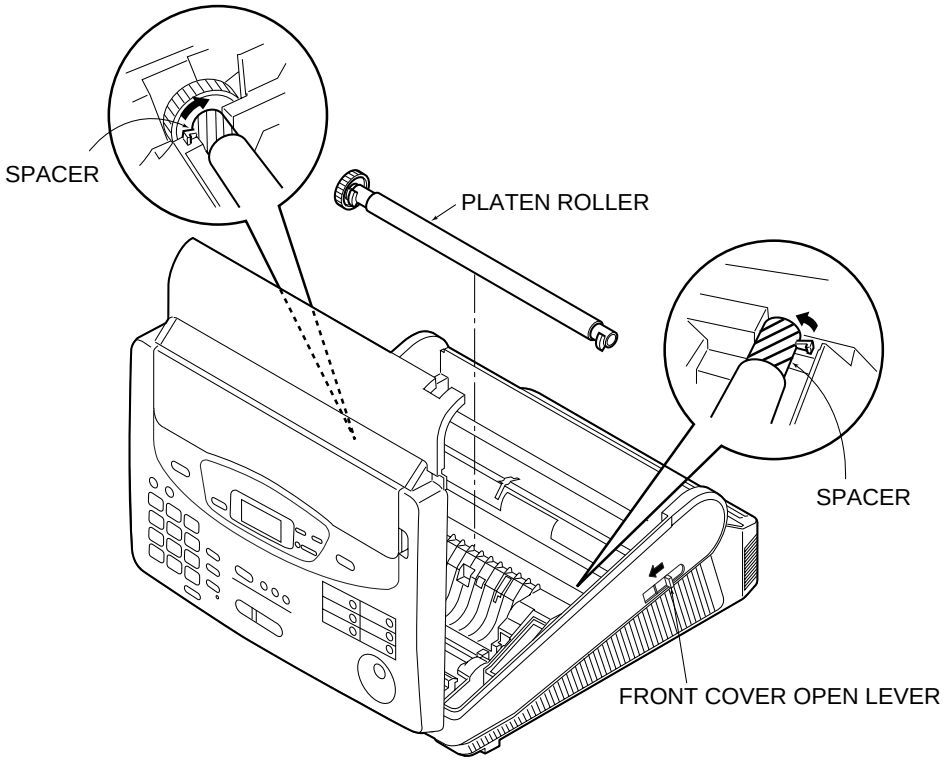


HOW TO CLEAN:
Clean the roller with cloth soaking in alcohl.
(Open the bottom cabinet in roller.)

Ref. No. 11 **HOW TO REMOVE THE PLATEN ROLLER**

Procedure 11

1) If a film cartridge is still installed, remove it.
2) Push the front lid open lever in the direction of the arrow to the operation panel.
3) Remove the platen roller.

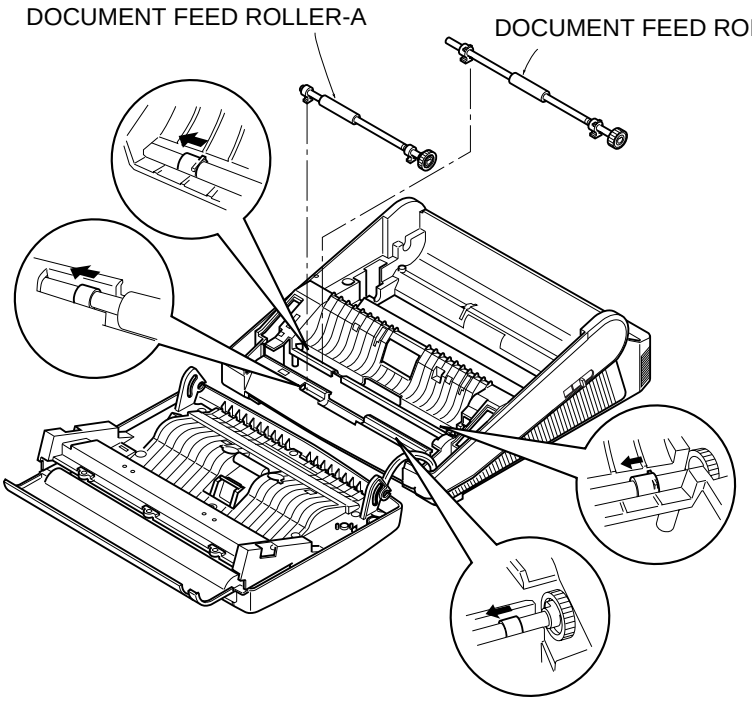


Ref. No. 12 **HOW TO REMOVE THE DOCUMENT FEED ROLLER**

Procedure 2→12

(DOCUMENT FEED ROLLER-A)
1) Slide the spacer and remove the roller.

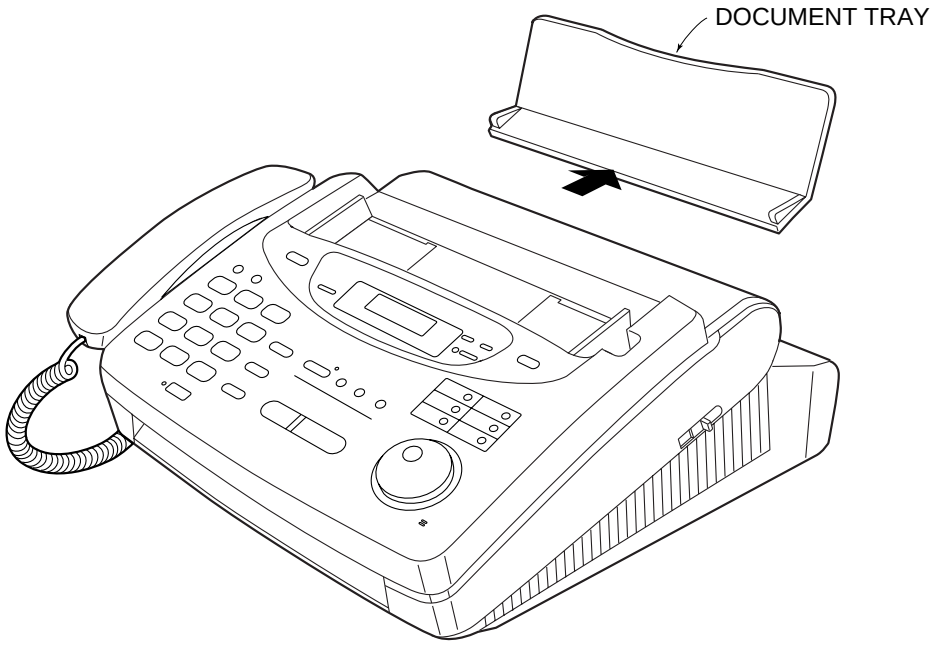
(DOCUMENT FEED ROLLER-B)
1) Remove the RX motor block. (See Ref. No. 9)
2) Slide the spacers and remove the roller.



HOW TO CLEAN:
Clean the roller with cloth soaking in alcohl.

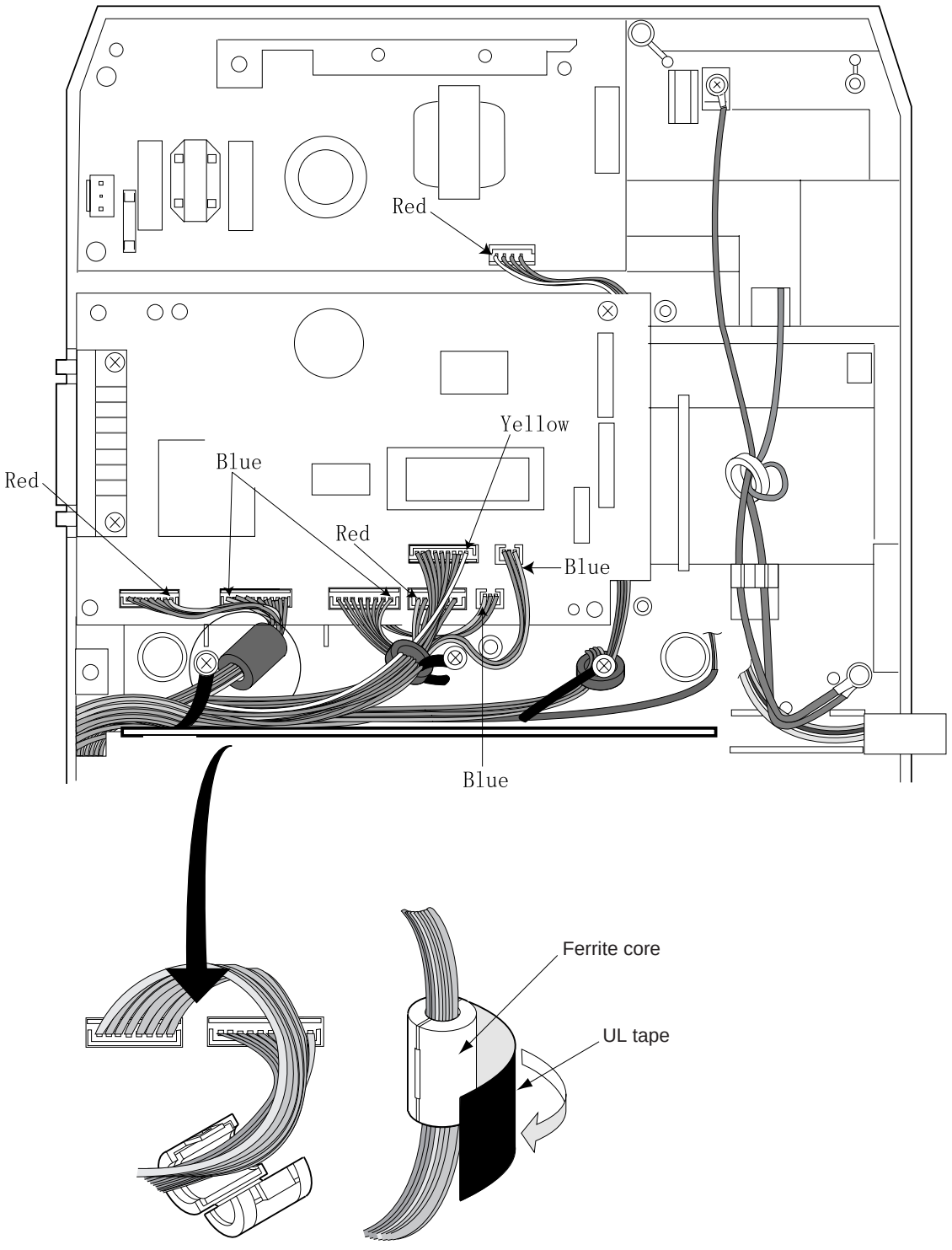
Ref. No. 13	**HOW TO REMOVE DOCUMENT TRAY**
Procedure 13	

1) Push the center section in the direction of the arrow to remove the document tray.



Installation position of lead wire

[Wiring]



Note:
After Ferrite core has been fitted, wind UL tape around it.

5 HOW TO REPLACE THE FLAT PACKAGE IC

Even if you do not have the special tools (for example, a spot heater) to remove the Flat IC, with some solder (large amount), a soldering iron and a cutter knife, you can easily remove the ICs that have more than 100 pins.

5.1. PREPARATION

- SOLDER

  Sparkle Solder 115A-1, 115B-1 OR Almit Solder KR-19, KR-19RMA

- Soldering iron

  Recommended power consumption is between 30 W to 40 W.
  Temperature of Copper Rod 662 ± 50°F (350 ± 10°C)
  (An expert may handle a 60~80 W iron, but a beginner might damage the foil by overheating.)

- Flux

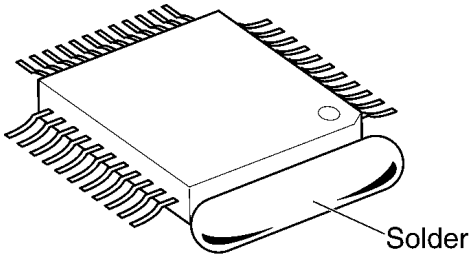
  HI115 Specific gravity 0.863
  (Original flux should be replaced daily.)

5.2. FLAT PACKAGE IC REMOVAL PROCEDURE

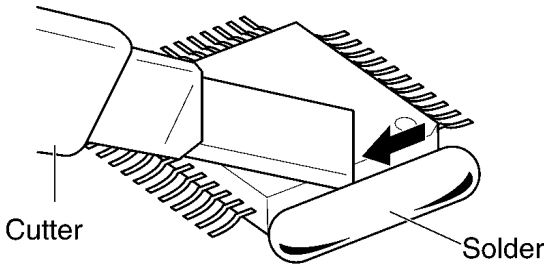
1. Put plenty of solder on the IC pins so that the pins can be completely covered.

   Note:

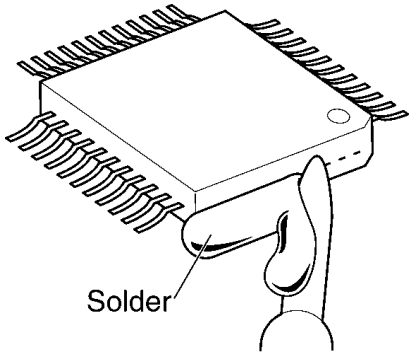
   If the IC pins are not soldered enough, you may give pressure to the P.C. board when cutting the pins with a cutter.



2. Make a few cuts into the joint (between the IC and its pins) first and then cut off the pins thoroughly.



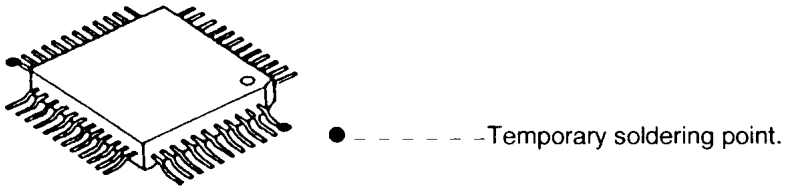
3. While the solder melts, remove it together with the IC pins.



When you attach a new IC to the board, remove all solder left on the land with some tools like a soldering wire. If some solder is left at the joint on the board, the new IC will not be attached properly.

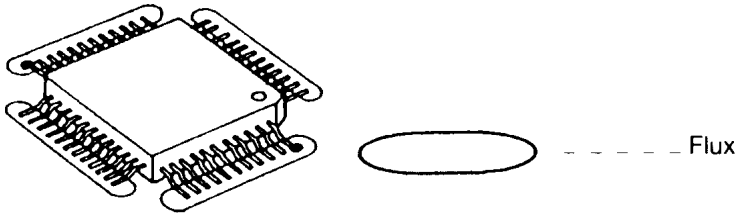
5.3. FLAT PACKAGE IC INSTALLATION PROCEDURE

1. Temporarily fix the FLAT PACKAGE IC, soldering the two marked pins.

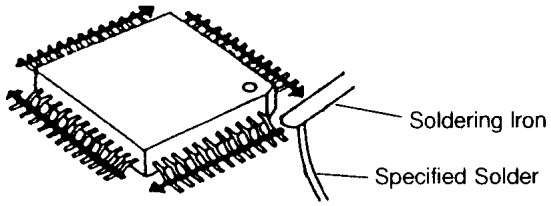


*Check the accuracy of the IC setting with the corresponding soldering foil.

2. Apply flux to all pins of the FLAT PACKAGE IC.

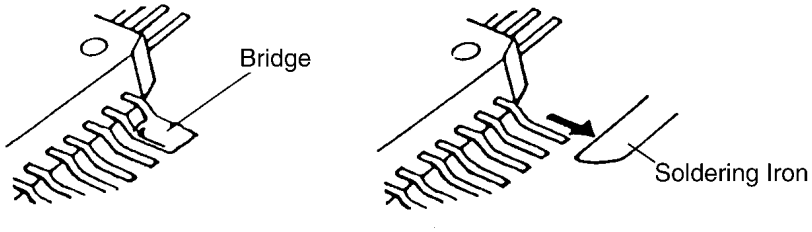


3. Solder the pins, sliding the soldering iron in the direction of the arrow.



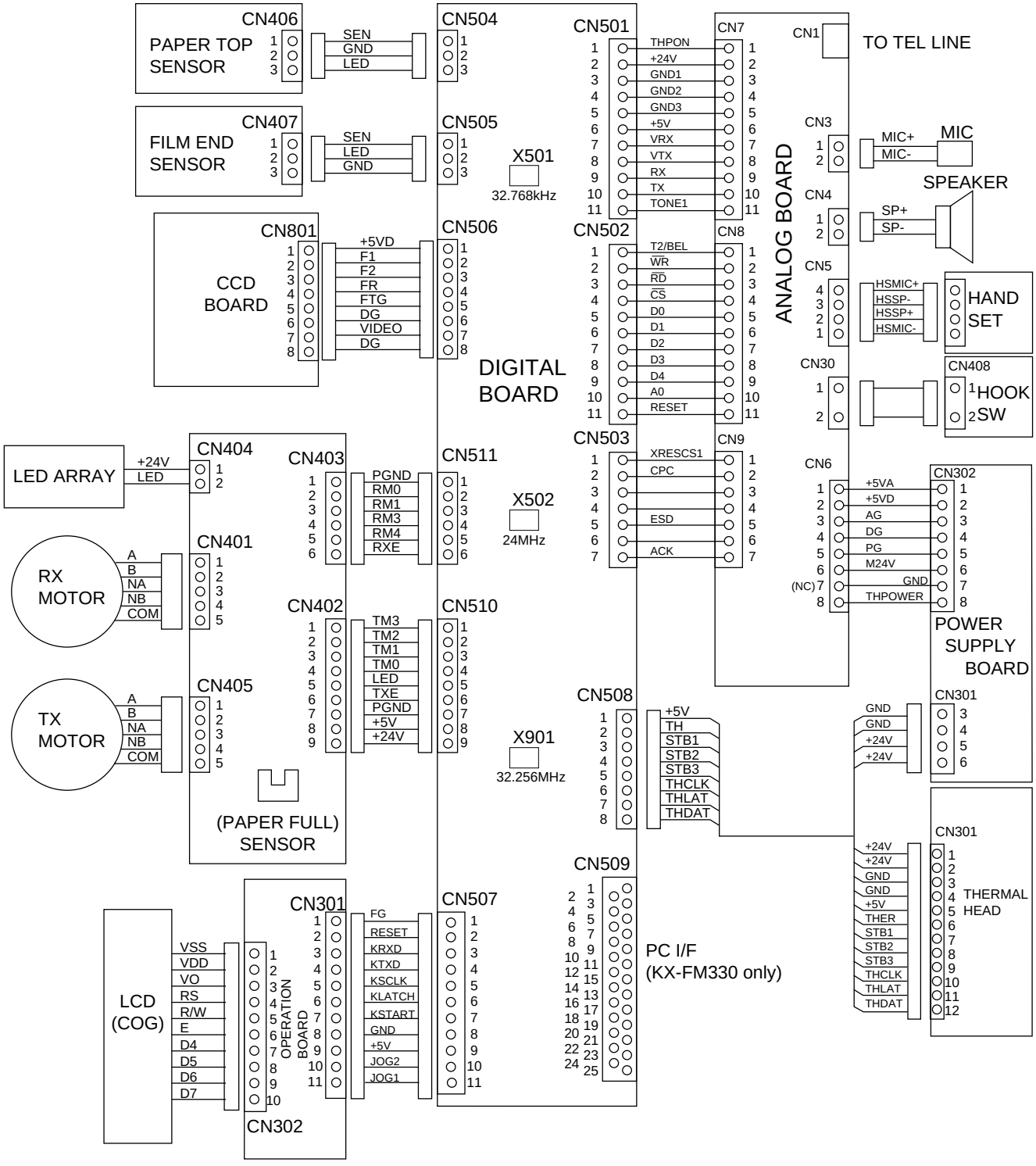
5.4. BRIDGE MODIFICATION PROCEDURE

1. Lightly resolder the bridged portion.
2. Remove the remaining solder along the pins using a soldering iron as shown in the figure below.



6 CIRCUIT OPERATIONS

6.1. CONNECTION DIAGRAM



6.2. GENERAL BLOCK DIAGRAM

The following is an outline of each device IC on the digital board. (Refer to **6.2.1. General Block Diagram**.).

1. ASIC (IC501)

   Composed mainly of an address decoder and modem control section.

   Controls the general FAX operations.

   Controls the operation panel I/F.

   Controls the thermal head I/F and CCD I/F.

   Executes image processing.

   CPU and Real time clock

   Provides the reset pulse to each of the major ICs.

   Controls the RS232C I/F (KX-FM330 Only)

2. ROM (IC502)

   Contains all of the program instructions for unit operations.

3. Static RAM (IC504)

   This memory is used mainly for the parameter working storage area.

4. Dynamic RAM (IC503)

   This memory is used mainly for the parameter working storage area.

5. MODEM (IC505)

   Executes modulation and demodulation for FAX communication.

   SP-Phone Communication

   TAM function

6. Read Section

   CCD image sensor to read transmitting documents.

7. Motor Driver (IC401, IC402)

   Drives the transmission motor and the reception motor.

8. Thermal Head

   Contains heating elements for dot matrix image printing.

9. Analog Board

   Composed of an ITS circuit and NCU circuit.

10. Sensor Section

    Composed of a cover open sensor, document sensor, read position sensor, set paper switch, paper full sensor, paper top sensor and film end sensor.

11. Power Supply Board Switching Section

    Supplies +5V and +24V to the unit.

12. FLASH Memory (IC901)

    Stores the voice data.

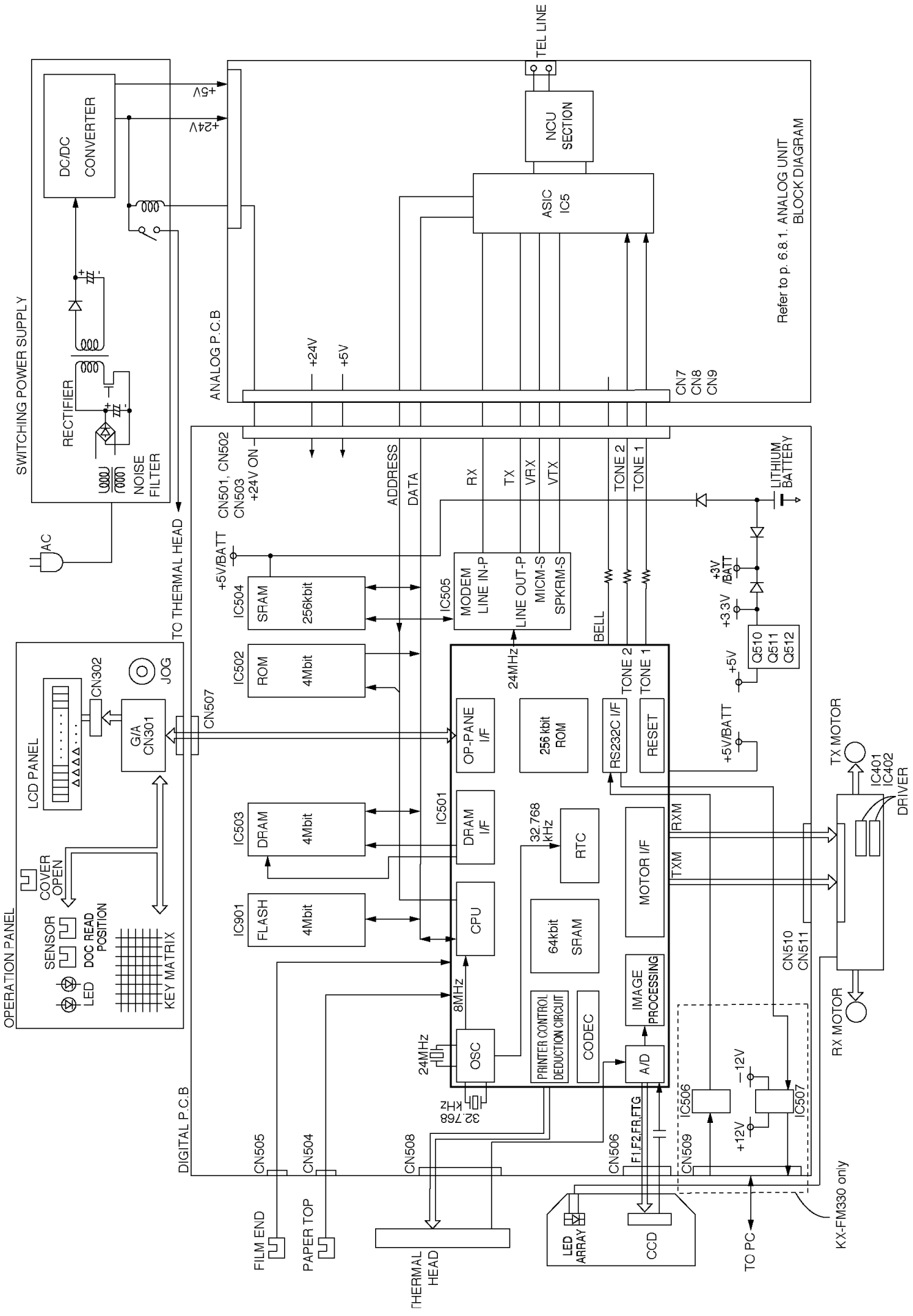
13. RS232C Driver (IC506, IC507)

    Drives RS232C I/F signal. (KX-FM330 Only)

14. +3.3V Generator (IC903)

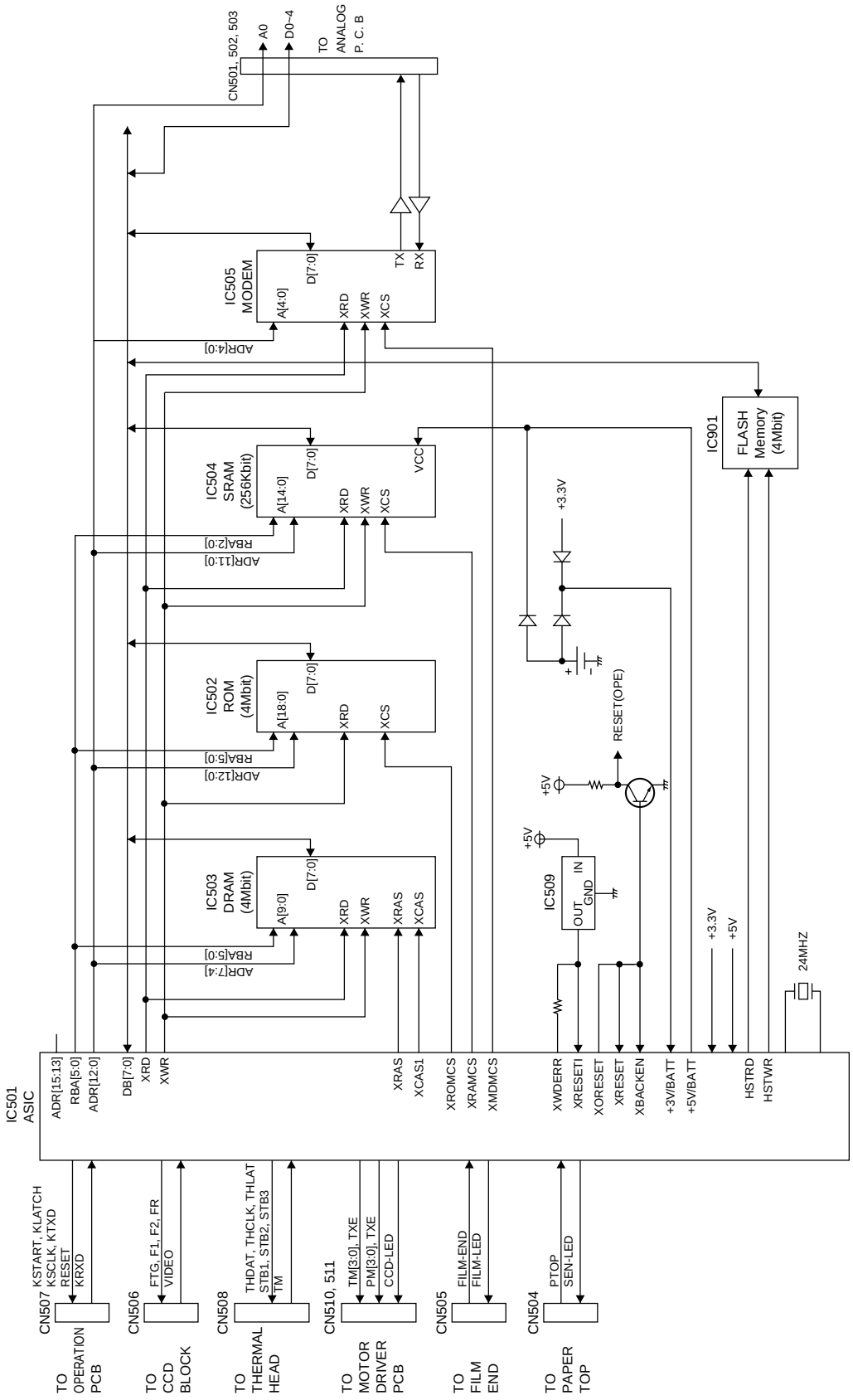
    Generates +3.3V for MODE (IC505).

6.2.1. General Block Diagram

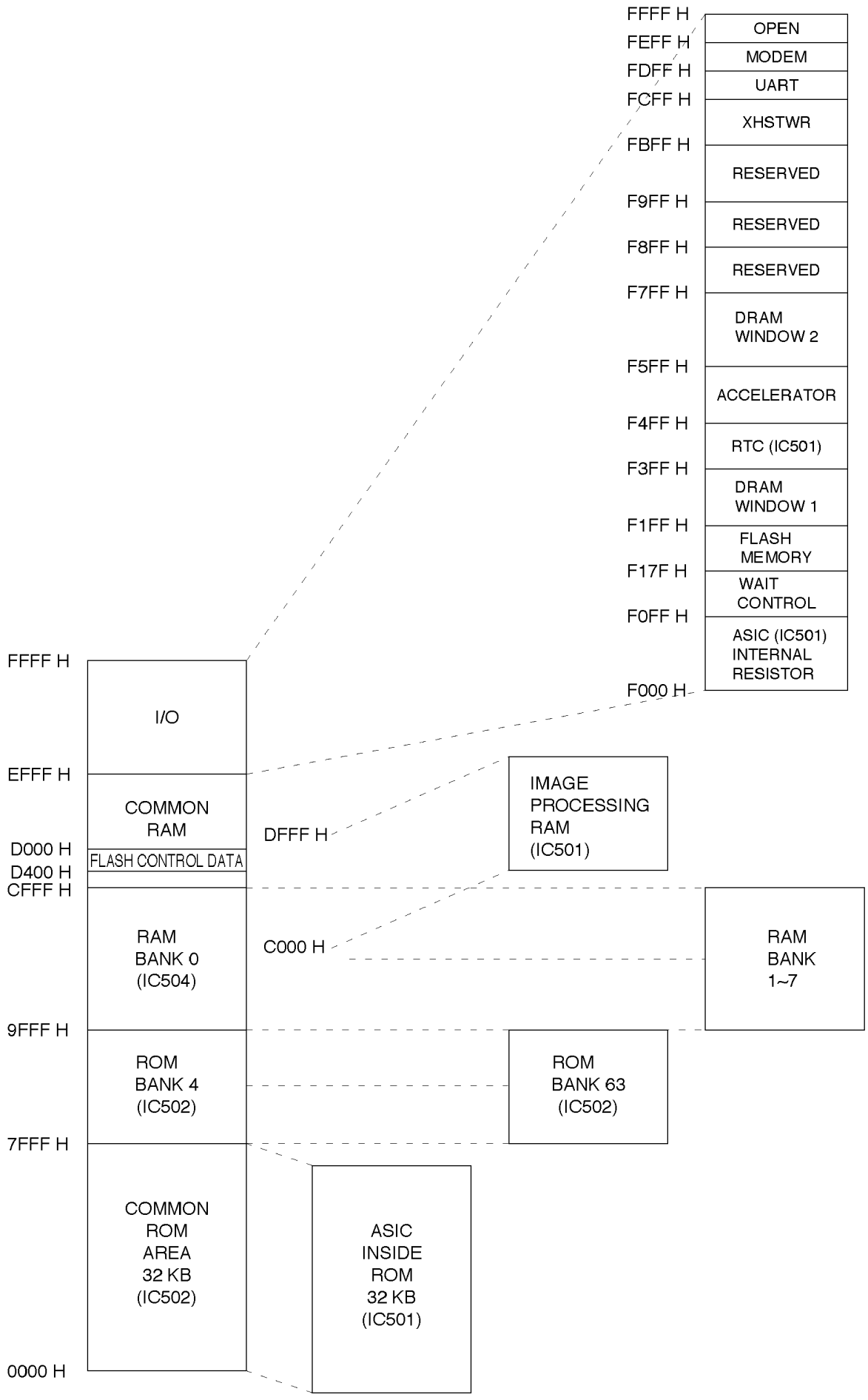


6.3. CONTROL SECTION

6.3.1. BLOCK DIAGRAM



6.3.2. MEMORY MAP



6.3.3. ASIC (IC501)

This custom IC is used for the general FAX operations.

1. CPU:

   This model uses a Z80 equivalent to the CPU operating at 12 MHz. Most of the peripheral functions are performed by custom-designed LSIs. Therefore, the CPU only works for processing the results.

2. RTC:

   Real Time Clock

3. DECODER:

   Decodes the address.

4. ROM/RAM I/F:

   Controls the SELECT signal of ROM or RAM and the bank switching.

5. CCD I/F:

   Controls the document reading.

6. IMAGE DATA RAM:

   This memory is programmed into the ASIC and uses 12 KB for the image processing. (See Fig. A.*)

7. THERMAL HEAD I/F:

   Transmits the recorded data to the thermal head.

8. MOTOR I/F:

   Controls the transmission motor which feeds the document.

   Controls the receiving motor which feeds the recording paper.

9. OPERATION PANEL I/F:

   Serial interface with Operation Panel.

10. I/O PORT:

    I/O Port Interface.

11. RS232C I/F:

    Serial interface with PC (KX-FM330 only)

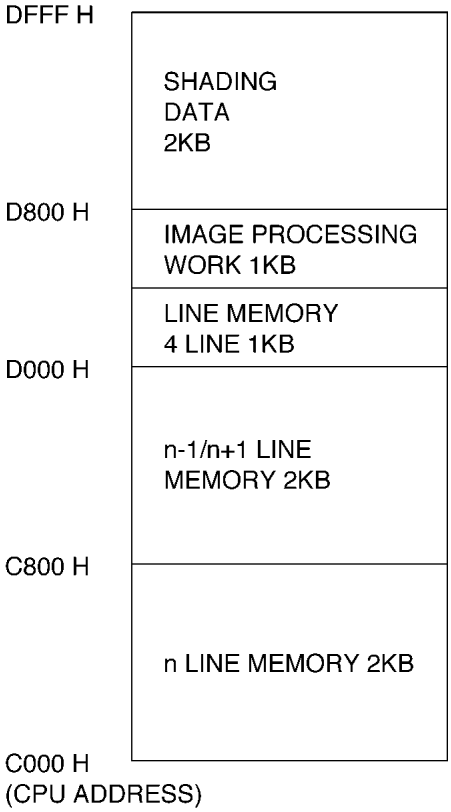


Fig. A

Note*:

This memory is incorporated into the ASIC (IC501) and used for the image processing.

Fig. A shows the memory map of the Image Data RAM.

6.3.4. ROM (IC502)

This 512KB ROM (EPROM or MASKROM) carries a common area of 32KB and bank areas which each have 8KB (BK4~BK63). The addresses from 0000H to 7FFFH are for the common area and from 8000H to 9FFFH are for the bank areas.

6.3.5. STATIC RAM (IC504)

This 32KB RAM carries a common area of 8KB and bank areas which each have 12KB (BK0~BK8, A, C, E). The addresses from 0000H to EFFFH are for the common area and from A000H to CFFFH are for the bank area.

6.3.6. DYNAMIC RAM (IC503)

The DRAM serves as CPU and receives memory.

The address is F200H~F3FFH (DRAM access window 1) and F600H~F7FFH (DRAM access window 2).

6.3.7. Flash Memory (IC901)

Used to store the voice data.

The control data are located in D000H~D400H.

Descriptions of Pin Distribution (IC501)

NO.	SIGNAL	I/O	POWER SUPPLIED VOLTAGE	EXPLANATION
1	AIN1	AI	ANALOG	ANALOG VIDEO SIGNAL
2	AIN2	AI	ANALOG	THERMISTOR VOLTAGE
3	AIN3	AI	ANALOG	THERMISTOR VOLTAGE etc.
4	AMON	AO	ANALOG	ANALOG MOINITOR
5	VSSB			GROUND FOR ANALOG VIDEO PROCESSOR
6	VDDB			POWER SUPPLY FOR ANALOG VIDEO PROCESSOR
7	3.3V/BATT			RTC BACKUP POWER SUPPLY
8	X32OUT	O	3.3V/BATT	RTC 32.768kHz OSCILLATOR
9	X32IN	I	3.4V/BATT	RTC 32.768kHz OSCILLATOR
10	VSS			GND
11	XBACKEN	I	5V/BATT	BACKUP ENABLE (FOR RTC)
12	5V/BATT			BACKUP POWER SUPPLY FOR RAMCS BUFFER/RESET
13	XRAMCS	O	5V/BATT	SRAM CHIP SELECT
14	XRAMCS2/ALARM	O	5V/BATT	2nd SRAM CHIP SELECT/RESCS2 BACKUP OUTPUT/RTC ALARM SELECTOR
15	FTG	O	5V	FTG
16	F1	O	5V	F1 (50%/75% SELECTOR)
17	F2	O	5V	F2/OUTPUT PORT SELECTOR
18	FR	O	5V	FR/OUTPUT PORT SELECTOR
19	JOG1	I	5V	VIDRST/INPUT OUTPUT PORT SELECTOR
20	JOG2	I	5V	SPHCLK/INPUT OUTPUT PORT SELECTOR
21	CCDON	O	5V	DARKON/INPUT OUTPUT PORT SELECTOR
22	CCDLED	O	5V	AIN2 CONTROL 2/INPUT OUTPUT PORT SELECTOR
23	CPC	I	5V	CPC (ALSO USED AS INPUT PORT)
24	SENLED	O	5V	BELL/OUTPUT SELECTOR
25	5V			POWER SUPPLY FOR BUFFER
26	VSS			GND
27	FILMEND	I	5V	"RVN (SCANNER ENCORDER ALSO USED AS INPUT PORT)"
28	MDMRST	O	5V	IrDA TXD/INPUT OUTPUT PORT SELECTOR
29	PTOP	I	5V	IrDA RXD/INPUT OUTPUT PORT SELECTOR
30	TXD	O	5V	RS232C I/F (TXD) : KX-FM330 only
31	RXD	O	5V	RS232C I/F (RXD) : KX-FM330 only
32	XRTS	O	5V	RS232C I/F (XRTS) : KX-FM330 only
33	XCTS	O	5V	RS232C I/F (XCTS) : KX-FM330 only
34	XDRS	O	5V	RS232C I/F (XDSR) : KX-FM330 only
35	DCD	O	5V	RS232C I/F (DCD) : KX-FM330 only
36	XDTR	O	5V	RS232C I/F (XDTR) : KX-FM330 only
37	FILMED	O	5V	UART/INPUT OUTPUT PORT SELECTOR
38	TONE1	AO	3.3V	TONE1 (ANALOG OUTPUT)
39	TONE2	AO	3.3V	TONE2 (ANALOG OUTPUT)
40	VOL1		(3.3V)	ELECTRIC VOLUME FOR SPEAKER
41	VOL2		(3.3V)	ELECTRIC VOLUME FOR SPEAKER
42	VOL3		(3.3V)	ELECTRIC VOLUME FOR SPEAKER
43	TRIGIN	O	5V	CROSS POINT IC/INPUT PORT SELECTOR
44	CALL2	O	5V	CROSS POINT IC/INPUT PORT SELECTOR
45	VOX	I	5V	CROSS POINT IC/INPUT PORT SELECTOR
46	XRESCS1	O	5V	CHIP SELECT 1/OUTPUT PORT SELECTOR
47	ESD	I	5V	GENERAL PURPOSE INPUT OUTPUT PROT
48	VSS			GND
49	5V			POWER SUPPLY FOR BUFFER
50	XNMI	I	5V	NMI/INT INPUT SELECTOR
51	ACK	O	5V	CORDLESS I/F (OUTPUT PORT SELECTOR)
52	TMU	I	5V	CORDLESS I/F OUTPUT PORT SELECTOR
53	DR	I	5V	CORDLESS I/F (ALSO USED AS INPUT PORT)
54	DCLK	I	5V	CORDLESS I/F (ALSO USED AS INPUT PORT)
55	DATA	O	5V	CORDLESS I/F (ALSO USED AS INPUT PORT)
56	NOT USED	O	5V	GENELRAL PURPOSE INPUT OUTPUT PORT
57	CALL1	I/O	5V	GENELRAL PURPOSE INPUT OUTPUT PORT
58	FCS	I/O	5V	FLASH MEMORY/INPUT OUTPUT PORT SELECTOR
59	ALE	I/O	5V	FLASH MEMORY/INPUT OUTPUT PORT SELECTOR
60	CLE	I/O	5V	FLASH MEMORY/INPUT OUTPUT PORT SELECTOR

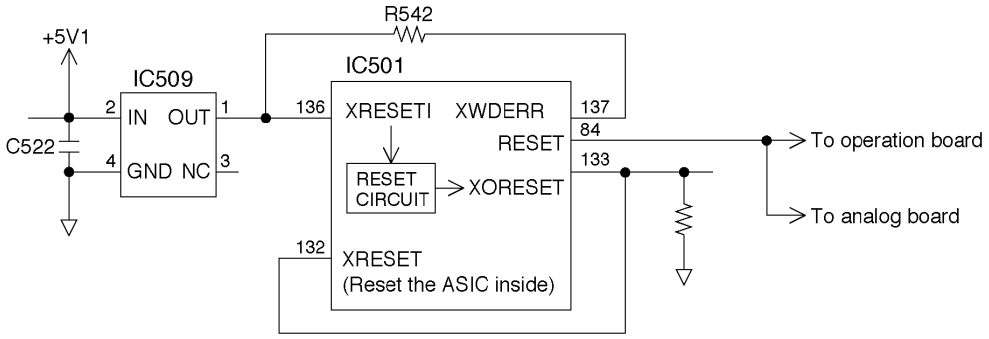
NO.	SIGNAL	I/O	POWER SUPPLIED VOLTAGE	EXPLANATION
61	R/B	I/O	5V	FLASH MEMORY/INPUT OUTPUT PORT SELECTOR
62	CS	O	5V	CHIP SELECT 3/OUTPUT PORT SELECTOR
63	NOT USED	I/O	5V	20kHz CLOCK OUT PUT/INPUT OUTPUT PORT SELECTOR
64	XHOLDAK	O	5V	INTERNAL CPU:XHOLDAK OUTPUT/EXTERNAL CPU:XHOLDAK INPUT
65	3.3V			POWER SUPPLY FOR INTERNAL LOGIC
66	XOUT	O	3.3V	24MHz OSCILLATOR
67	XIN	I	3.3V	24MHz OSCILLATOR
68	VSS			GND
69	5V			POWER SUPPLY FOR BUFFER
70	XTEST	O	5V	24MHZ CLOCK OUTPUT
71	CPUCK	O	5V	CPU CLOCK (6MHz/8MHZ/12MHz) OUTPUT
72	TEST1	I	5V	TEST PIN. FIXED HIGH
73	TEST2	I	5V	TEST PIN. FIXED HIGH
74	TEST3	I	5V	TEST PIN. FIXED HIGH
75	TEST4	I	5V	TEST PIN. FIXED HIGH
76	XMDMINT	I	5V	MODEM INTERRUPT
77	XMDMCS	O	5V	MODEM CHIP SELECT
78	VSS			GND
79	3.3V			POWER SUPPLY FOR INTERNAL LOGIC
80	XWAIT/IP60	I	5V	INPUT PORT/EXTERNAL CPU:XWAIT OUTPUT
81	XHOLD/IP61	I	5V	INPUT PORT/EXTERNAL CPU:XHOLD OUTPUT
82	XHSTRD/IOP40	I/O	5V	FLASH MEMORY CONTROL SIGNAL (XHST RD)
83	XHSTWR/IOP41	I/O	5V	FLASH MEMORY CONTROL SIGNAL (XHST WR)
84	XOPRBE/MUX/OP53	O	5V	OPRBE/ADDRESS MULTIPLEX CONTROL FOR DRAM/OUTPUT PORT
85	ADR15	O	5V	ADDRESS PIN FOR DEBUG
86	ADR14	O	5V	ADDRESS PIN FOR DEBUG
87	ADR13	O	5V	ADDRESS PIN FOR DEBUG
88	XRAS	O	5V	RAS/INPUT OUTPUT PORT SELECTOR
89	XCAS1	O	5V	DRAM1 CAS/INPUT OUTPUT PORT SELECTOR
90	THON	I/O	5V	DRAM2 CAS/INPUT OUTPUT PORT SELECTOR
91	VSS			GND
92	3.3V			POWER SUPPLY FOR INTERNAL LOGIC
93	XRESCS2/OP71	O	5V	MODEM CONTROL SIGNAL (CSBR)
94	DB3	I/O	5V	DATA BUS
95	DB2	I/O	5V	DATA BUS
96	DB4	I/O	5V	DATA BUS
97	DB1	I/O	5V	DATA BUS
98	DB5	I/O	5V	DATA BUS
99	DB0	I/O	5V	DATA BUS
100	DB6	I/O	5V	DATA BUS
101	DB7	I/O	5V	DATA BUS
102	VSS			GND
103	5V			POWER SUPPLY FOR BUFFER
104	XROMCS	O	5V	ROM CHIP SELECT
105	XRD	O	5V	READ PULSE OUTPUT
106	XWR	O	5V	WRITE PULSE OUTPUT
107	ADR0	O	5V	ADDRESS BUSS
108	ADR1	O	5V	ADDRESS BUSS
109	ADR2	O	5V	ADDRESS BUSS
110	ADR3	O	5V	ADDRESS BUSS
111	ADR4	O	5V	ADDRESS BUSS (ALSO USED AS DRAM ADDRESS)
112	ADR5	O	5V	ADDRESS BUSS (ALSO USED AS DRAM ADDRESS)
113	ADR6	O	5V	ADDRESS BUSS (ALSO USED AS DRAM ADDRESS)
114	ADR7	O	5V	ADDRESS BUSS (ALSO USED AS DRAM ADDRESS)
115	ADR8	O	5V	ADDRESS BUSS
116	ADR9	O	5V	ADDRESS BUSS
117	ADR10	O	5V	ADDRESS BUSS
118	ADR11	O	5V	ADDRESS BUSS
119	ADR12	O	5V	ADDRESS BUSS (ALSO USED AS DRAM ADDRESS)
120	VSS			GND

NO.	SIGNAL	I/O	POWER SUPPLIED VOLTAGE	EXPLANATION
121	5V			POWER SUPPLY FOR BUFFER
122	RBA0	O	5V	BANK ADDRESS (ALSO USED AS DRAM ADDRESS)
123	RBA1	O	5V	BANK ADDRESS (ALSO USED AS DRAM ADDRESS)
124	RBA2	O	5V	BANK ADDRESS (ALSO USED AS DRAM ADDRESS)
125	RBA3	O	5V	BANK ADDRESS (ALSO USED AS DRAM ADDRESS)
126	RBA4	O	5V	BANK ADDRESS (ALSO USED AS DRAM ADDRESS)
127	RBA5/OP	O	5V	BANK ADDRESS (ALSO USED AS DRAM ADDRESS)/OUTPUT PORT SELECTOR
128	RBA6/IOP96	I/O	5V	BANK ADDRESS/INPUT OUTPUT PORT SELECTOR
129	IOP95	I/O	5V	GENELRAL PURPOSE INPUT OUTPUT PORT/GENERAL PURPOSE COUNTER INPUT
130	IOP94	I/O	5V	GENERAL PURPOSE INPUT OUTPUT PORT
131	IOP93	I/O	5V	GENERAL PURPOSE INPUT OUTPUT PORT
132	XRESET	I	5V	RESET INPUT FOR INTERNAL DIGITAL CIRCUIT
133	XORESET	O	5V	NO CHATTERING RESET (XRESET NOISE REDUCTION)
134	5V			POWER SUPPLY FOR BUFFER
135	VSS			GND
136	XRESETI	I	5V	INPUT COMPARATOR OUTPUT FOR RESET.
137	XWDERR	OD	5V	WATCH DOG ERROR
138	XRSTSWI/IP83	I	5V	RESET SWITCH INPUT/ALSO USED AS INPUT PORT
139	XRSTSWO/OP82	O/Z	5V	RESET SWITCH OUTPUT/OUTPUT PORT SELECTOR
140	XRESETD	O	5V	RESET OUTPUT (NEGATIVE LOGIC)
141	IOP57	I/O	5V	GENERAL PURPOSE INPUT OUTPUT PORT
142	STB1	O	5V	THERMAL HEAD STROBE 1
143	STB2	O	5V	THERMAL HEAD STROBE 2
144	3.3V			POWER SUPPLY INTERNAL LOGIC
145	VSS			GND
146	STB3	O	5V	THERMAL HEAD STROBE 3
147	STB4	O	5V	THERMAL HEAD STROBE 4
148	STBNP	I	5V	INPUT PORT
149	THDAT	O	5V	THERMAL HEAD DATA
150	THCLK	O	5V	THERMAL HEAD CLOCK
151	THLAT	O	5V	THERMAL HEAD LATCH
152	RM0	O	5V	MOTOR CONTROL/INPUT OUTPUT PORT SELECTOR
153	RM1	O	5V	MOTOR CONTROL/INPUT OUTPUT PORT SELECTOR
154	RM2	O	5V	MOTOR CONTROL/INPUT OUTPUT PORT SELECTOR
155	RM3	O	5V	MOTOR CONTROL/INPUT OUTPUT PORT SELECTOR
156	RXE	O	5V	MOTOR CONTROL/INPUT PORT SELECTOR
157	TM0	O	5V	MOTOR CONTROL/INPUT OUTPUT PORT SELECTOR
158	5V			POWER SUPPLY FOR BUFFER
159	VSS			GND
160	TM1	O	5V	MOTOR CONTROL/INPUT OUTPUT PORT SELECTOR
161	TM2	O	5V	MOTOR CONTROL/INPUT OUTPUT PORT SELECTOR
162	TM3	O	5V	MOTOR CONTROL/INPUT OUTPUT PORT SELECTOR
163	TXE	O	5V	MOTOR CONTROL/INPUT PORT SELECTOR
164	KSTART	O	5V	OPERATION PANEL I/F
165	KLATCH	O	5V	OPERATION PANEL I/F (ALSO USED AS OUTPUT PORT)
166	KSCLK	O	5V	OPERATION PANEL I/F
167	KTXD	O	5V	OPERATION PANEL I/F
168	KRXD	I	5V	OPERATION PANEL I/F
169	ADSEL1	O/Z	5V	AIN 2 CONTROL 1
170	VSSC		5V	GND FOR ANALOG VIDEO PROCESSOR
171	VDDC			POWER SUPPLY FOR ANALOG VIDEO PROCESSOR
172	VSSA			GND FOR ANALOG VIDEO PROCESSOR
173	VDDA			POWER SUPPLY FOR ANALOG VIDEO PROCESSOR
174	VREFB	AO	ANALOG	A/D REFERENCE-
175	VCL	AO	ANALOG	CLAMP LEVEL
176	VREFT	AO	ANALOG	A/D REFERENCE+

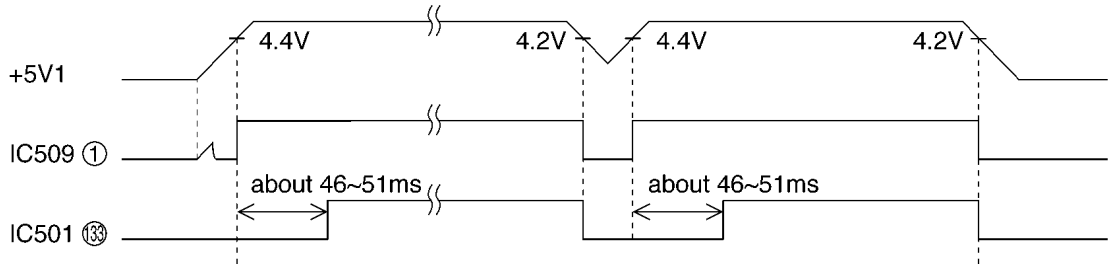
6.3.8. RESET CIRCUIT (WATCH DOG TIMER)

The output signal from pin 1 of the voltage detect IC (IC509) is input to the ASIC (IC501) 136 pin. Then the outputsignal from pin 133 of the ASIC (IC501) resets the ASIC, the MODEM (IC505) and the gate array (IC501) on theoperation board.

Circuit Diagram



1. During a momentary power interruption, a positive reset pulse of 46~51 msec is generated and the system is reset completely.



2. When pin 132 and 133 of IC501 become low level, they will prohibit the SRAM (IC504) from changing data.
   The SRAM (IC504) will go into the backup mode, when they are backed up by a lithium battery.
3. The watch dog timer, built-in the ASIC (IC501), is initialized by the CPU about every 1.5 ms.
   When a watch dog error occurs, pin 137 of the ASIC (IC501) becomes low level.
   The terminal of the **WDERR** signal is connected to the reset line, so the **WDERR** signal works as the reset signal.

6.3.9. SRAM AND RTC BACKUP CIRCUIT

1. **Function**

   This unit has a lithium battery (BATT) which works for the SRAM (IC504) and Real Time Clock IC (RTC: inside IC501).

   The user parameters for autodial numbers, the system setup data and others are stored in the SRAM (IC504).

   The RTC continues to work, backed up by a lithium battery even when the power switch is OFF.

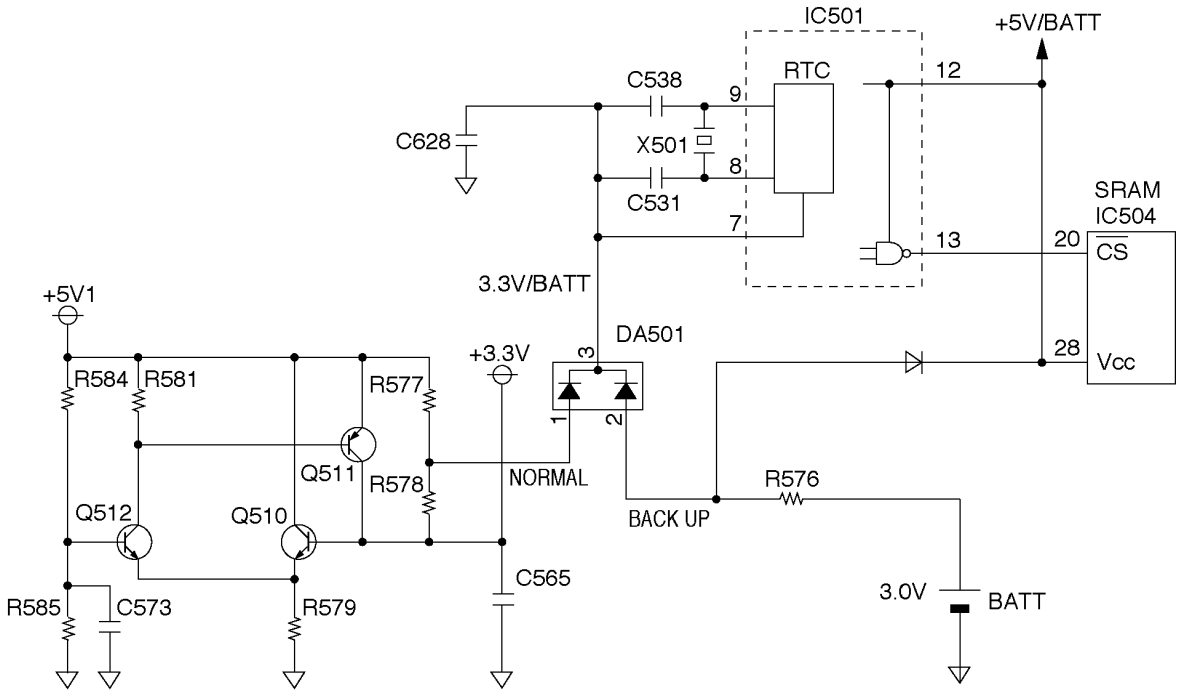
2. **SRAM (IC504) Backup Circuit Operation**

   When the power switch is turned ON, power is supplied through pin 12 of IC501 to the SRAM (IC504). At this time, the voltage at pin 28 of the SRAM is 5V. When the power switch is turned OFF, the BATT supplies power to the SRAM through J501, R576 and D508. The voltage at pin 28 of the SRAM is about +2.5V. When the power switch is OFF and the voltage of +5V decreases, the voltage detect IC (IC509) outputs "Low " level and the IC501 outputs the reset signal. Pin 28 of the SRAM becomes roughly the same voltage as the battery voltage. At this point, pin 20 (CS) of IC504 becomes high level, causing the SRAM to go into the backup mode, in which the power consumption is lower.

3. **RTC Inside (IC501) Backup Circuit Operation**

   When the power switch is turned ON, power is supplied through DA501 to the RTC (inside IC501). At this time, the voltage at pin 7 of the IC501 is +3.3V. When the power switch is turned OFF, the BATT supplies power to RTC through DA501. The voltage at pin 7 of IC501 is about +2.5V. When the power switch is OFF and the voltage of +3.3V decreases, pin 7 of RTC (IC501) becomes roughly the same voltage as the battery voltage. RTC goes into the backup mode, in which the power consumption is lower.

Circuit Diagram

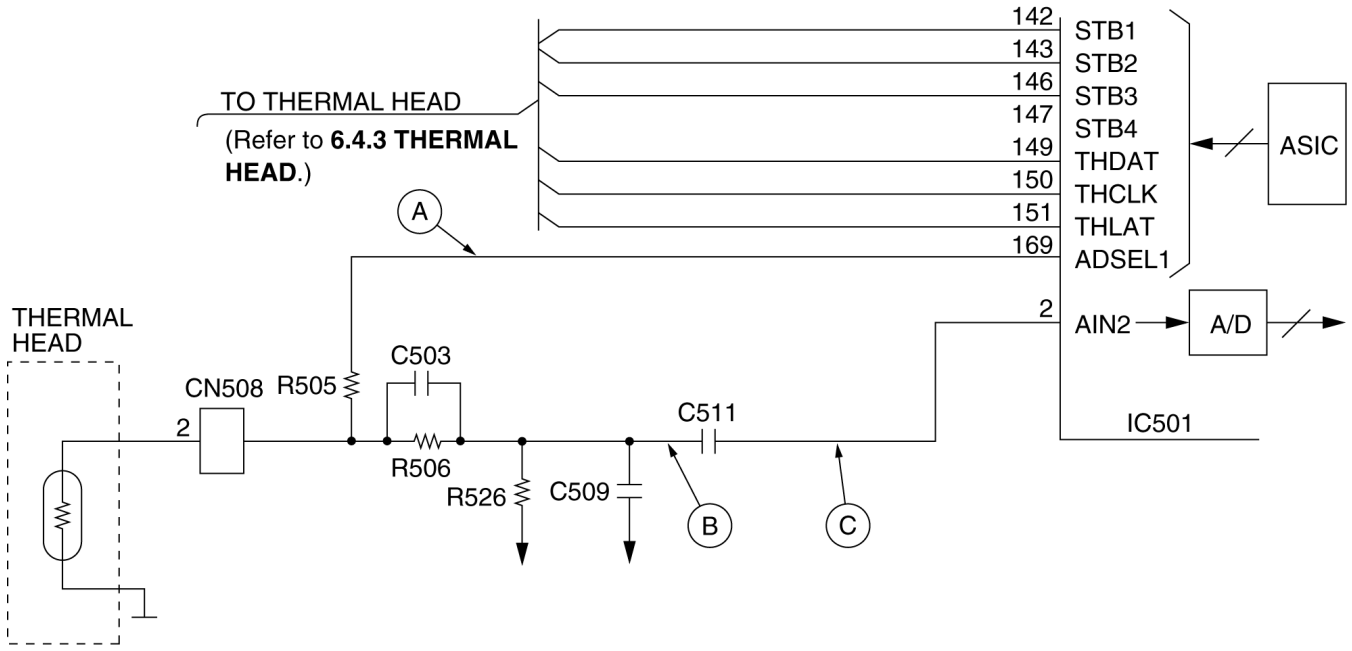


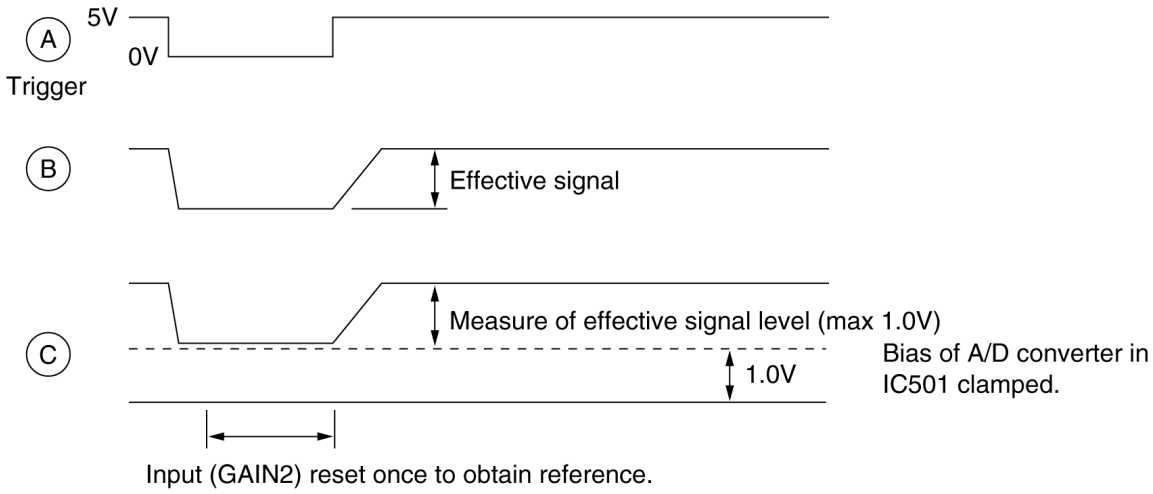
6.3.10. SUPERVISION CIRCUIT FOR THE THERMAL HEAD TEMPERATURE

1. **Function**

The thermistor changes the resistor according to the temperature and uses the thermistor´s characteristics. The output of pin 169 of IC501 becomes a low level. Then when it becomes a high level, it triggers point **A**. In point **C**, according to the voltage output time, the thermal head´s temperature is detected.

After the thermal head temperature is converted to voltage in **B**, it is then changed to digital data in the A/D converter inside IC501. The CPU decides the strobe width of the thermal head according to this value. Therefore, this circuit can keep the thermal head at an even temperature in order to stabilize the printing density and prevent the head from being overheated.

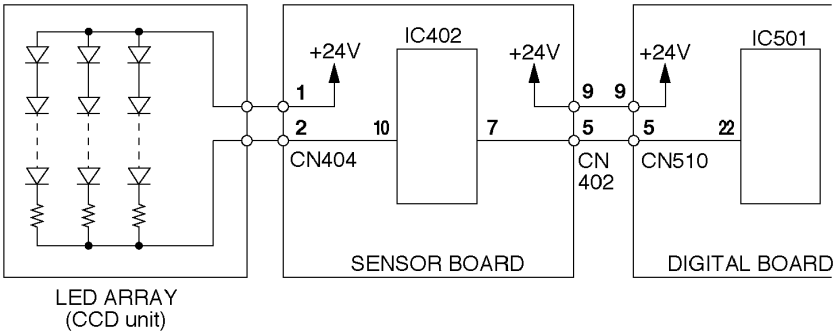




6.3.11. LED ARRAY

The LED ARRAY will light during transmission and copying as a light source to recognize document characters, patterns, or graphics on a document. Pin 22 of IC501 is low level while the LED array is lit.It is also possible to light the LED ARRAY in the test mode (SCAN CHECK: Refer to 2.5. TEST FUNCTIONS.).

Circuit Diagram



6.4. FACSIMILE SECTION

6.4.1. IMAGE DATA FLOW DURING FACSIMILE OPERATION

COPY (Fine, Super-Fine, Half Tone)

1. White plate information is read by the CCD (to be used as the reference white level) via route **1**, and the result is input to IC501. Refer to the block diagram on the following page.
2. In IC501, the data is adjusted to a suitable level for A/D conversion in the Analog Signal Processing Section, and via route **2** it is input to A/D conversion (8 bit). After finishing A/D conversion, the data is input to the Image Processing Section via route **3**. Then via routes **4** and **5**, it is stored in RAM as shading data.
3. The draft's information that is read by CCD is input to IC501 via route **1**. After adjusting it to a suitable level for A/D conversion via route **2**, the draft's information is converted to A/D (8 bit), and it is input to the Image Processing Section. The other side, the shading data which flows from RAM via route **6** and **7**, is input to the Image Processing Section. After finishing the draft's information image processing, white is regarded as "0" and black is regarded as "1". Via routes **4** and **5** , they are stored in RAM.
4. The white/black data stored as above via routes **6** and **8** , is input to the P/S converter. The white/black data converted to serial data in the P/S converter is input to the Thermal Head via route **9** and is printed out on recording paper.

   Note:

   Standard : Reads 3.58 times/mm

   Fine : Reads 7.7 times/mm

   Super-Fine : Reads 15.4 times/mm

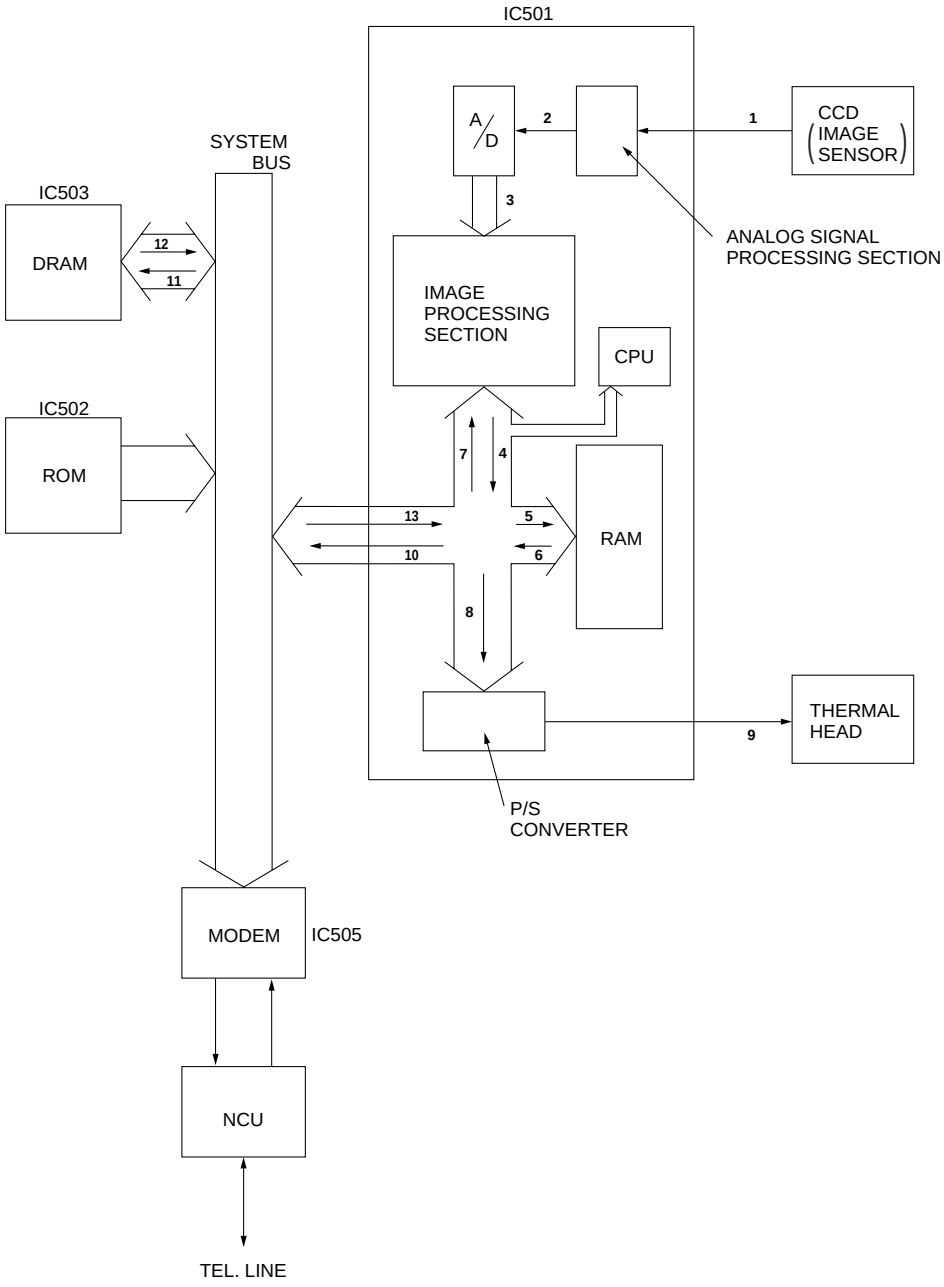
Transmission

1. Same processing as **COPY** items 1) - 3).
2. The data stored in the RAM of IC501 is output from IC501 via routes **6** and **10** , and is stored in the system bus. Via route **11** , it is stored in the communication buffer inside DRAM (IC503).
3. While retreiving data stored in the communication buffer synchronous with the modem, the CPU (inside IC501) inputs the data to the modem along route **12** , where it is converted to serial analog data and forwarded over the telephone lines via the NCU Section.

Reception

1. The serial analog image data is received over the telephone lines and input to the modem via the NCU section, where it is demodulated to parallel digital data. Then the CPU (IC501) stores the data in the communication buffer DRAM (IC503) along route **12**.
2. The data stored in DRAM (IC503) is decoded by the CPU (IC501) via route **12** , and is stored in DRAM (IC503) via routes **13** and **5**.
3. Same processing as **COPY** item 4).

6.4.2. Block Diagram



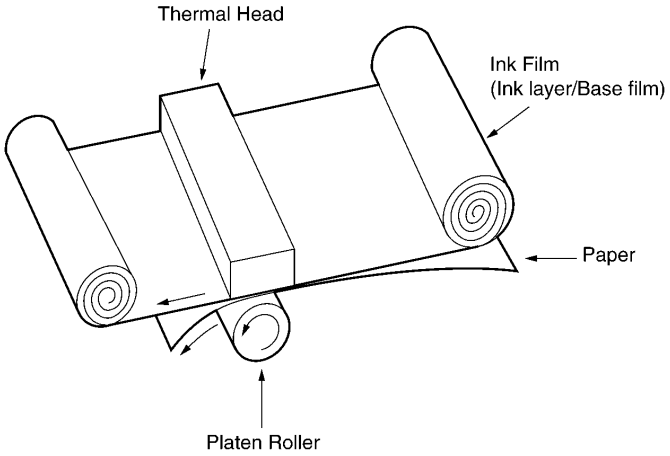
6.4.3. THERMAL HEAD

1. **Function**

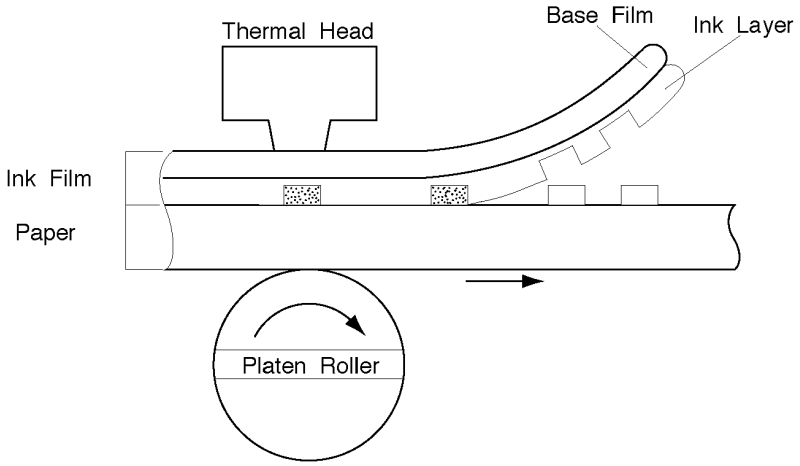
This unit utilizes the state of the art thermal printer technology.

The ink film is chemically processed. The ink film is comprised of two parts: an ink layer and a base film. When the thermalhead contacts this ink film, it emits heat momentarily, and the ink layer is melted and transferred to the paper. If this continues, letters and/or diagrams appear, and the original document is reproduced.

COMPOSITION OF THE RECEIVE RECORD SECTION (THERMAL RECORDING FORMAT)



Thermal Transfer



2. **Circuit Operation**

Refer to the block diagram and the timing chart on the following page.

There are 27 driver ICs aligned horizontally on the thermal head and each one of these ICs can drive 64 heat-emitting registers. This means that one line is at a density of 64×27=1728 dots=(8 dots/mm).

White/Black (white=0, black=1) data in one line increment is synchronized at IC501 pin 150 (THCLK), and sent from IC501 pin 149 (THDAT) to the shift register of the ICs. The shift registers of the 27 ICs are connected in series, and upon the shift of the 1728 dot increment, the shift register becomes filled with data, and a latch pulse is emitted to each IC from IC501 pin 151 (THLAT).

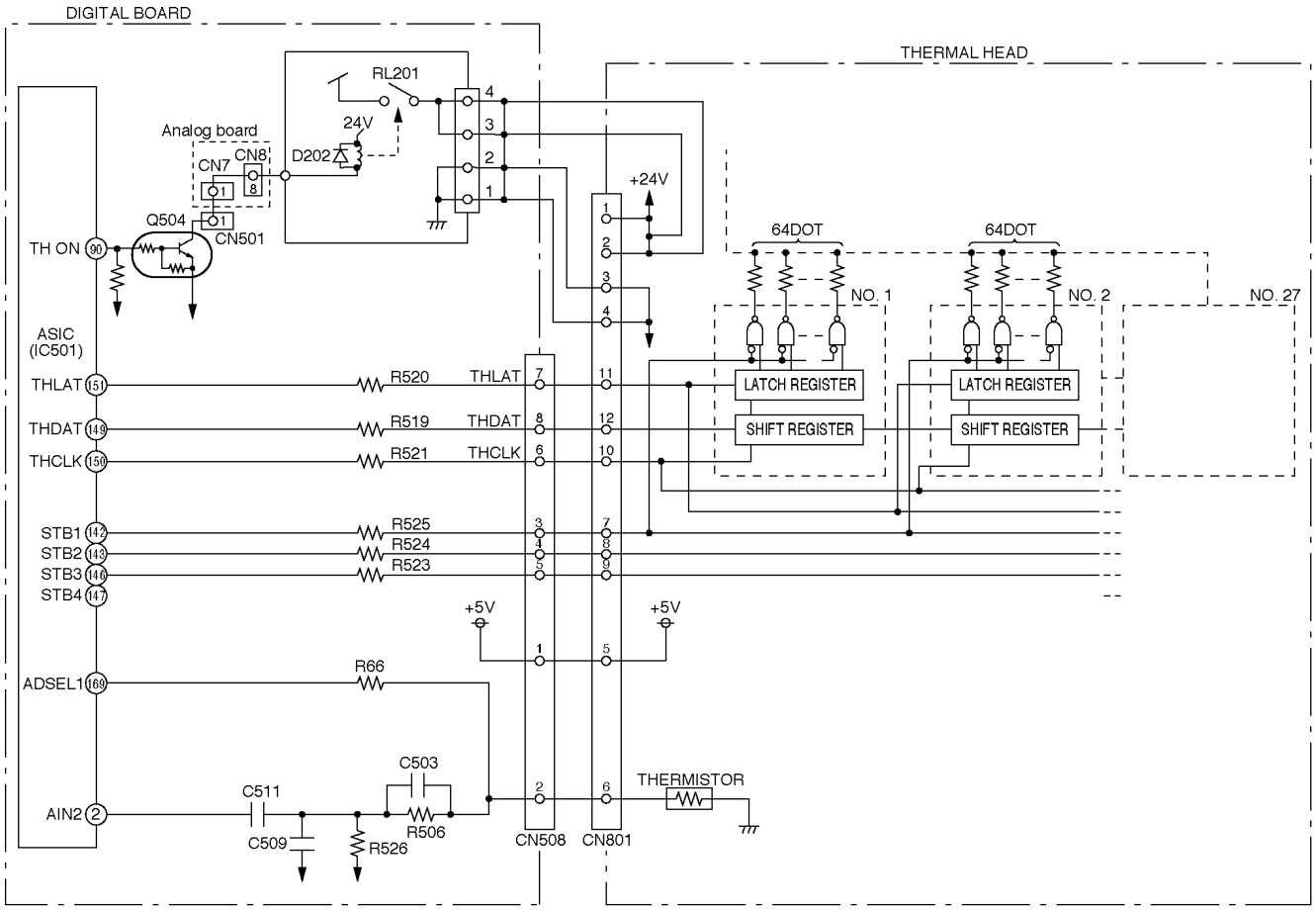
With this latch pulse, all the contents of the shift registers are latched to the latch registers. Thereafter, through the addition of strobes from the IC501 pins (142, 143, 146), only the dot location of black (=1) among latched data activates the driver, and the current passes to heat the emitting body to cause heat emission.

Here, the three line strobes, STB1 to STB3, impress at intervals of 9.216 msec, as required for one-line printout.

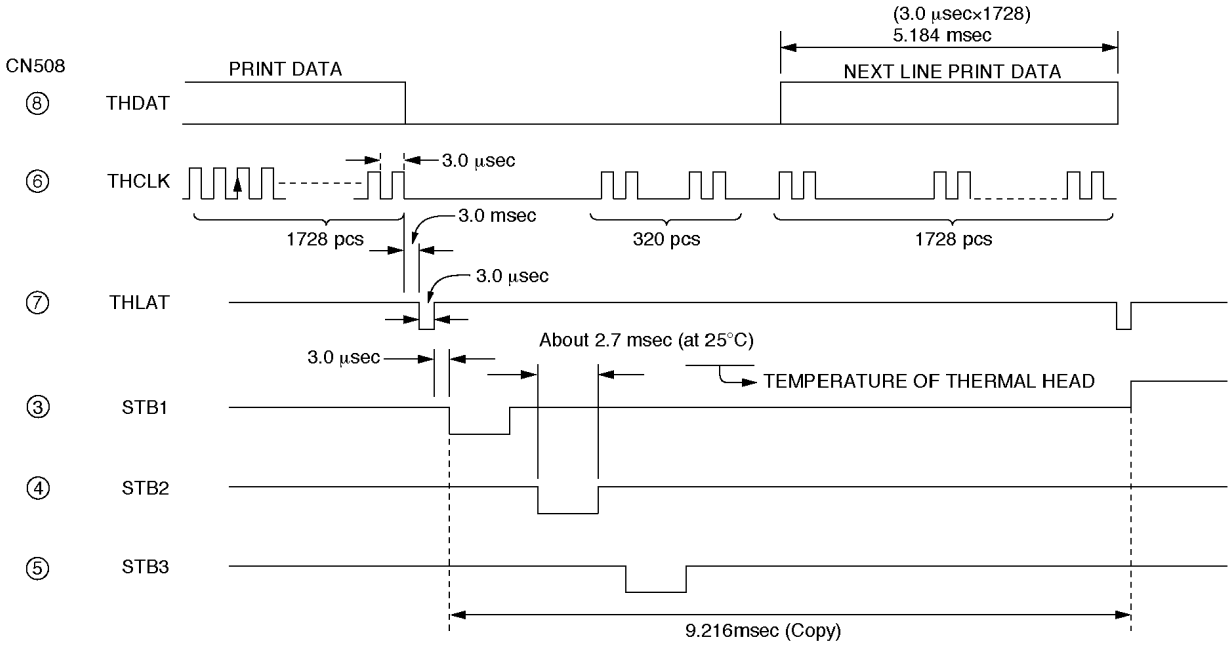
The sequence is shown on the next page. [Moreover, for the strobe width, the thermistor value inside the thermal head is detected according to IC501 pin 2. Depending on that value, the strobe width is recorded in ROM (IC502). Accordingly, the strobe width is determined.]

When the thermal head is not used, the IC501 (141, THON) becomes low , Q501 turns OFF, IC508 turns OFF, and the +24V power supply for the thermal head driver is not impressed to protect the IC.

Circuit Diagram



Timing Chart



6.4.4. READ SECTION

1. **Function**

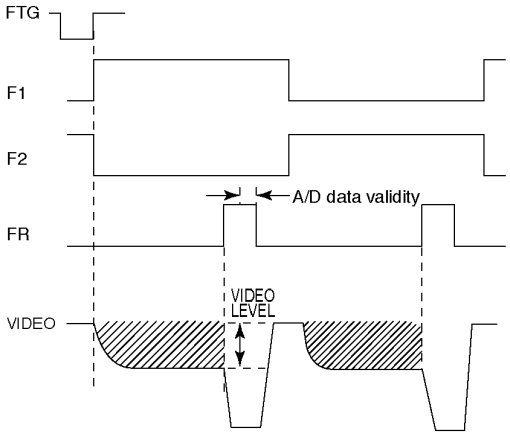
- A document is illuminated by the LED array, and the reflections pass through the reduction-projection lens and are imaged on the CCD image sensor.
- The document image is photoelectrically transferred by the CCD image sensor, and an analog image signal corresponding to one line of the document is output continuously.
- The analog image signal enters the image signal processing circuit in ASIC (IC501) and then is converted into digital data.

2. **Circuit Operation**

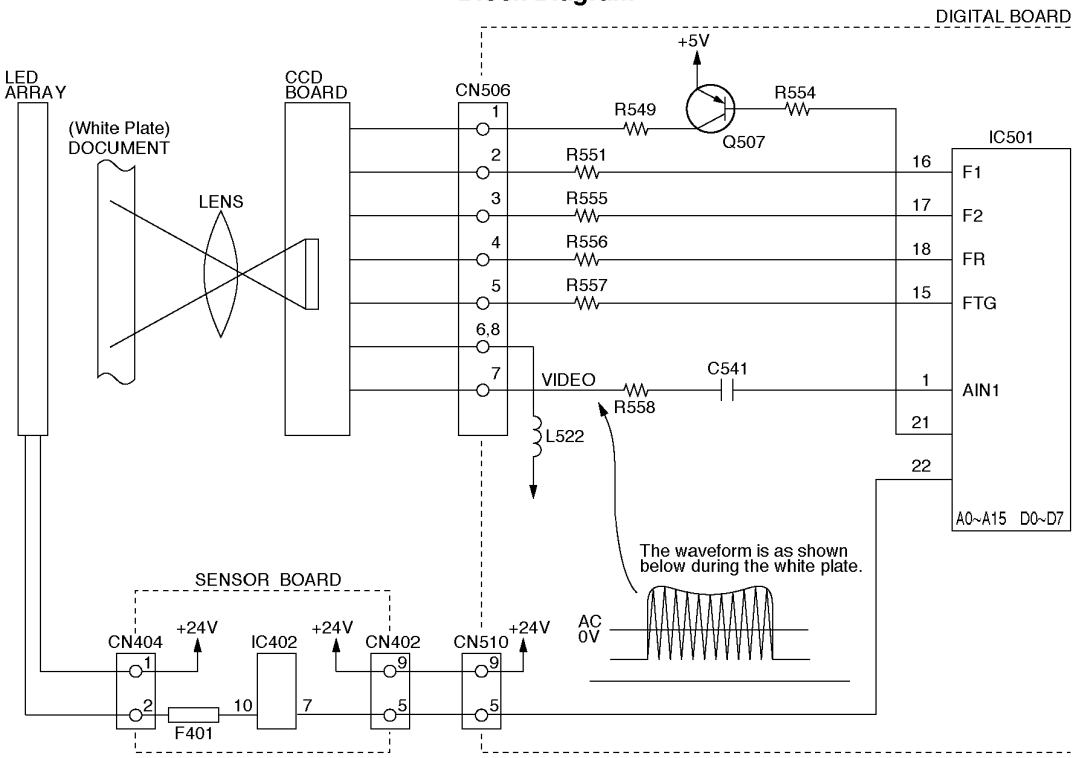
[Start]

When the START/COPY button is pressed, pin 21 of IC501 goes to a low level and Q507 is turned ON. This makes pin 22 of IC501 a high level and the voltage applied to the LED array turns on the LED. F1, F2, FR and FTG signals are output to the CCD board to drive the CCD image sensor. Therefore, when the LED is turned ON, the VIDEO (analog image signal) is output from the CCD board to pin 7 of CN506.

CCD Scannar Timing Chart (1 Dot Cycle)



Block Diagram



6.4.5. STEPPING MOTOR DRIVE CIRCUIT

1. **Function**

   Two individual stepping motors are used for transmission and reception. They feed the document or recording paper synchronized for reading or printing.

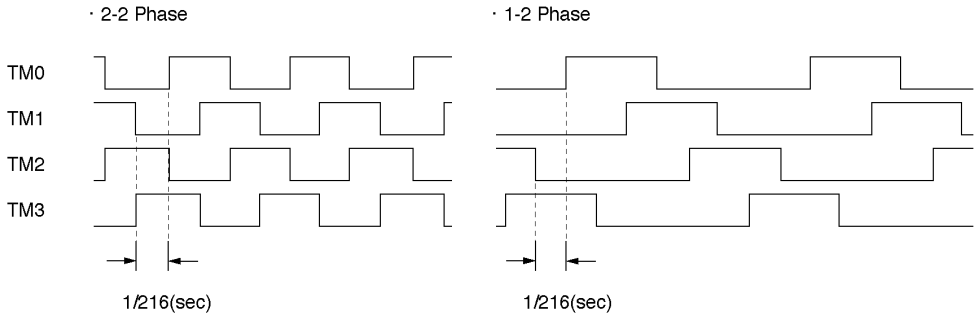
2. **TX Motor**

   During motor driving, pin 163 of ASIC IC501 becomes a high level, driver pin 12 of IC402 becomes a low level, and Q402 turns ON. As a result, +24V is supplied to the motor coil.

   Stepping pulses are output from gate array IC501 pins, 157, 160~162, causing driver IC402 pins, 16~13 to drive the TX Motor Coil. The motor coil is energized sequentially in 2 phase increments, which causes a 1-step rotation. A 1-steprotation feeds 0.13 mm of recording paper or document paper.

   The timing chart is shown below.

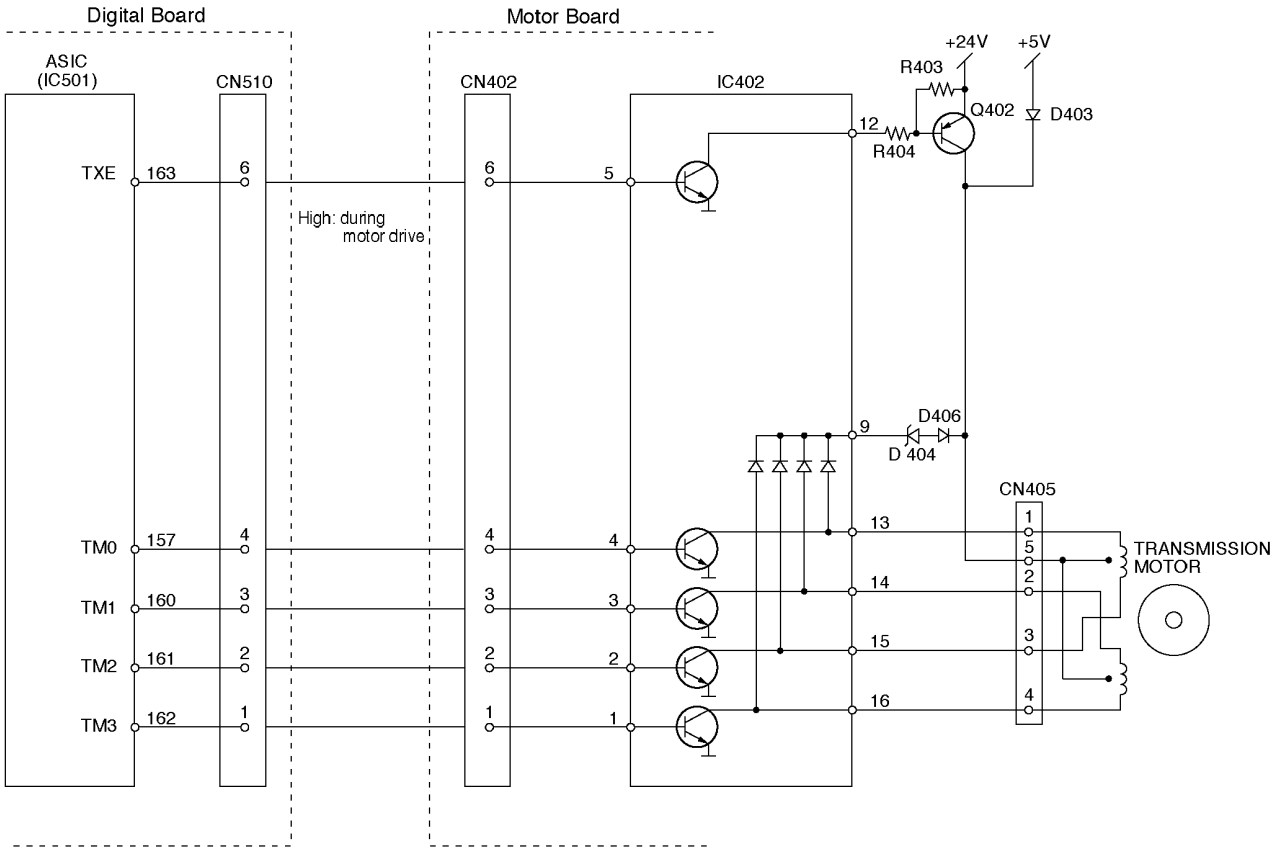
Stepping Motor Timing Chart



Stepping Motor Drive Mode

Function	Mode	Phase Pattern	Speed
Copy	Fine	1-2	216 pps
FAX	Standard	2-2	216 pps
	Fine or Half tone	1-2	216 pps
Paper Feed	———	2-2	216 pps
Stand-by	———	All phases are currently off.	None

Circuit Diagram



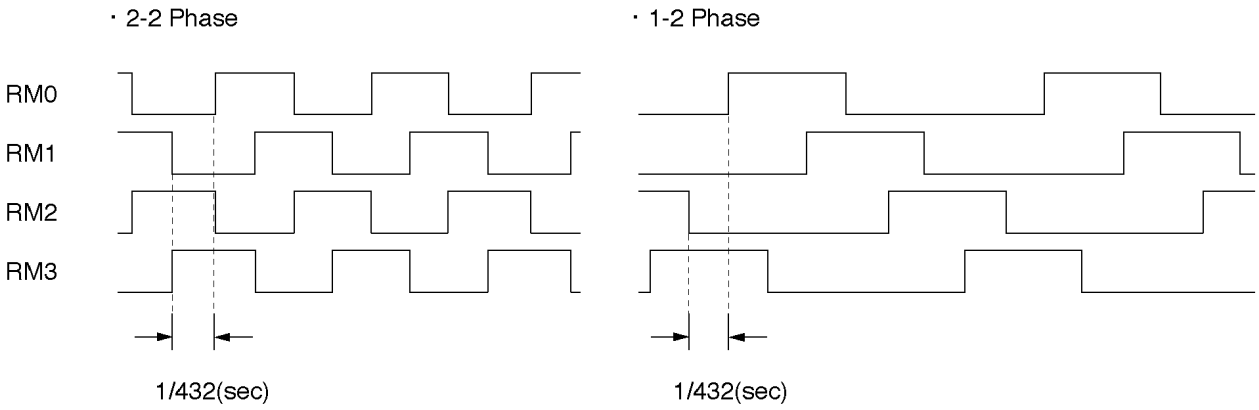
When the motor is stopped for a period (about 70~80 msec) during the receive mode, pin 163 of ASIC IC501 becomes a low level and driver IC402 pin 13 becomes a high level. This causes Q402 to turn OFF, and instead of +24 V, +5 V is supplied through D403 so that the motor is held in place. When the system is in the stand-by mode, all of the motor drive transistors are OFF. Therefore the motor current is OFF.

3. **RX Motor**

During motor driving, pin 156 of ASIC IC501 becomes a high level, driver IC401 pin 14 becomes a low level, and Q401 turns ON. As a result, +24V is supplied to the motor coil.

Stepping pulses are output from ASIC IC501 pins, 152~155, causing driver IC401 pins, 13~10 to drive the RX Motor Coil. The motor coil is energized sequentially in 2 phase increments, which causes a 1-step rotation. A 1-step rotation feeds 0.13 mm of recording paper or document paper. The timing chart is below.

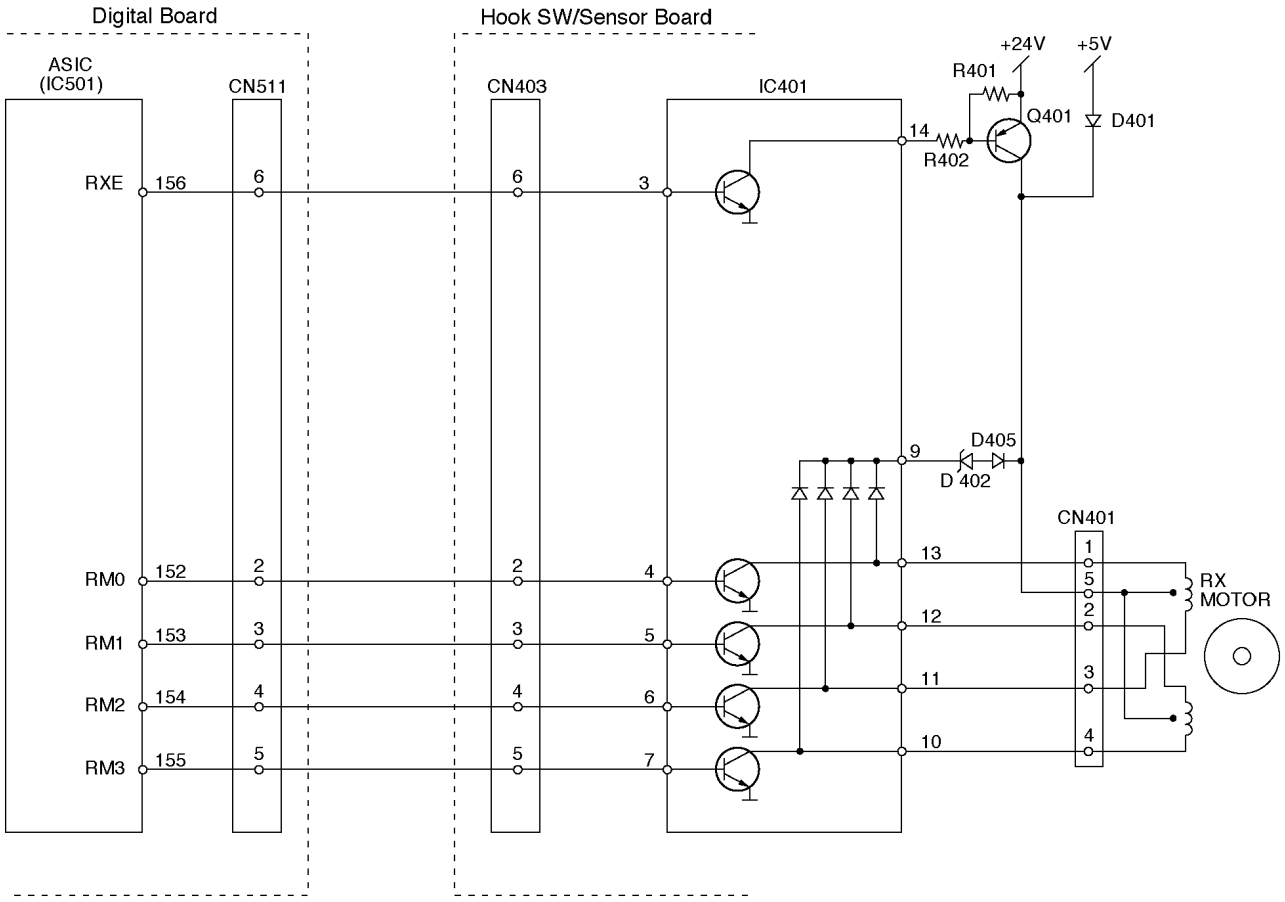
Stepping Motor Timing Chart



Stepping Motor Drive Mode

Function	Mode	Phase Pattern	Speed
Copy	Fine	1-2	432 pps
FAX	Standard	1-2	432 pps
	Fine or Half tone	1-2	432 pps
Paper Feed	———	1-2	432 pps
Stand-by	———	All phases are currently off.	None

Circuit Diagram



When the motor is stopped for a period (about 70~80 msec) during the receive mode, pin 156 of ASIC IC501 becomes a low level and driver IC401 pin 14 becomes a high level. This causes Q401 to turn OFF, and instead of +24V, +5V is supplied through D401 so that the motor is held in place. When the system is in the stand-by mode, all of the motor drive transistors are OFF. Therefore the motor current is OFF.

6.5. SENSORS AND SWITCHES

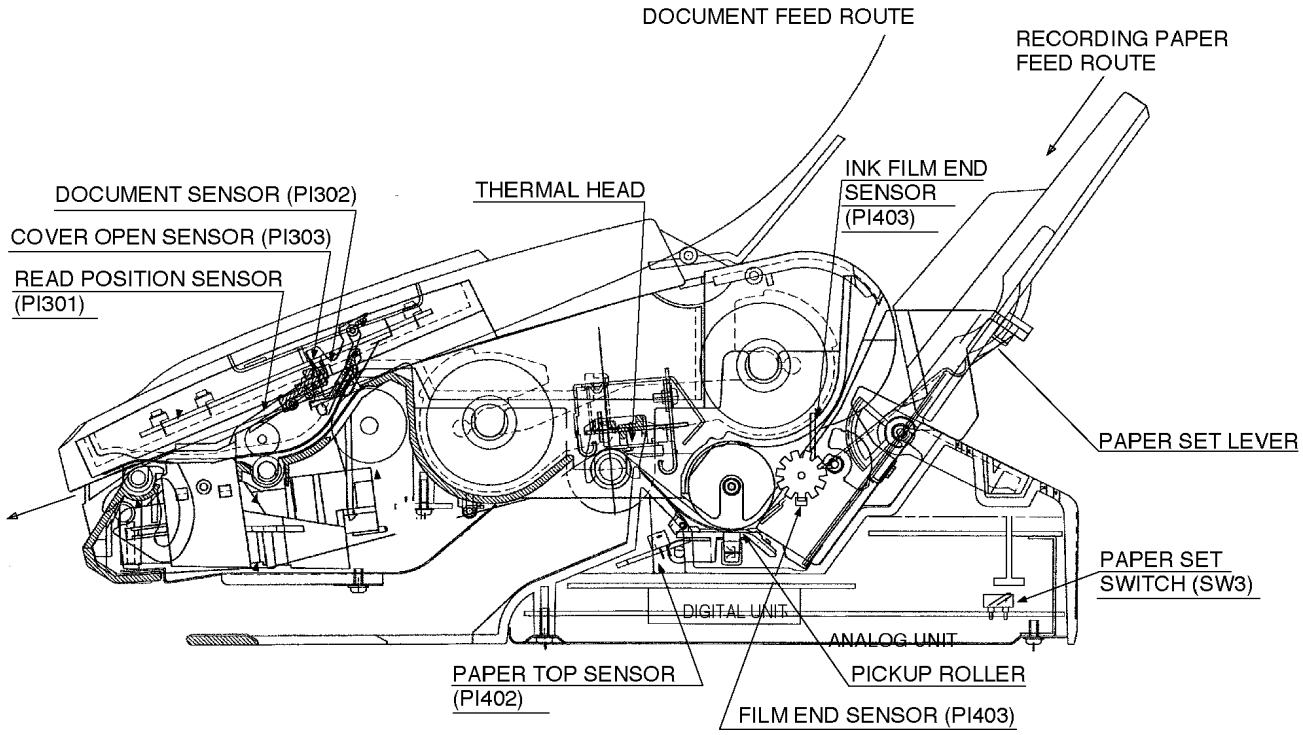
All of the sensors and switches are shown below.

Sensor Circuit Location	Sensor	Sensor or Switch Name	Message Error
Operation Panel	PI301	Document Read Position	[REMOVE DOCUMENT]
	PI302	Document	[CHECK DOCUMENT]
	PI303	Cover Open	[CHECK COVER]
Digital PCB &Analog PCB &Sensor PCB	SW401	Hook	———
	SW3	Paper SEt	[CHECK LEVER]
	PI402	Paper Top	[PAPER JAMMED]
	PI403	Film End	[FILM EMPTY]

Note:

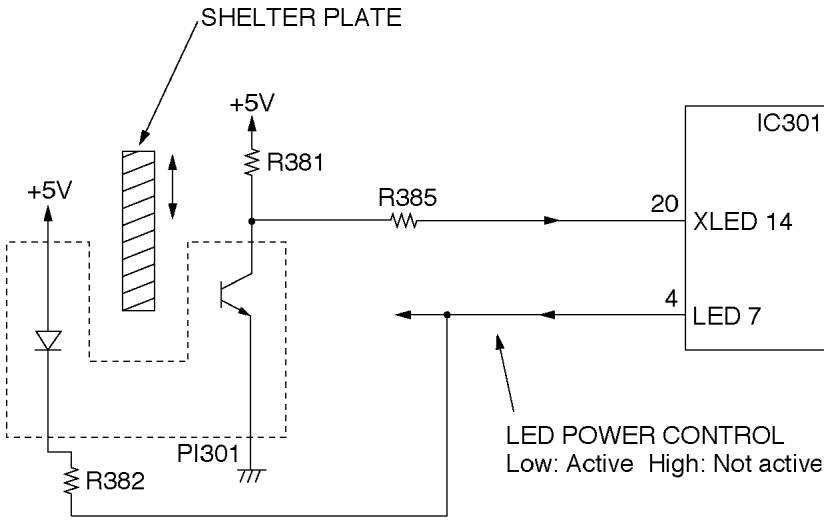
See **2.5. TEST FUNCTIONS**. (#815: Sensor Check)

Sensor Locations



1. **[Read Position Sensor (PI301)]**

When a document is brought to the read position, the shelter plate is lifted, the phototransistor becomes ON, and the input signal of IC301-20 pin (Operation) becomes a low level. When there is no document at the read position, the shelter plate closes the sensor light, the phototransistor becomes OFF, and the input signal of IC301-20 pin (Operation) becomes a high level. (When checking this sensor, the IC301-9 pin becomes a low level.)

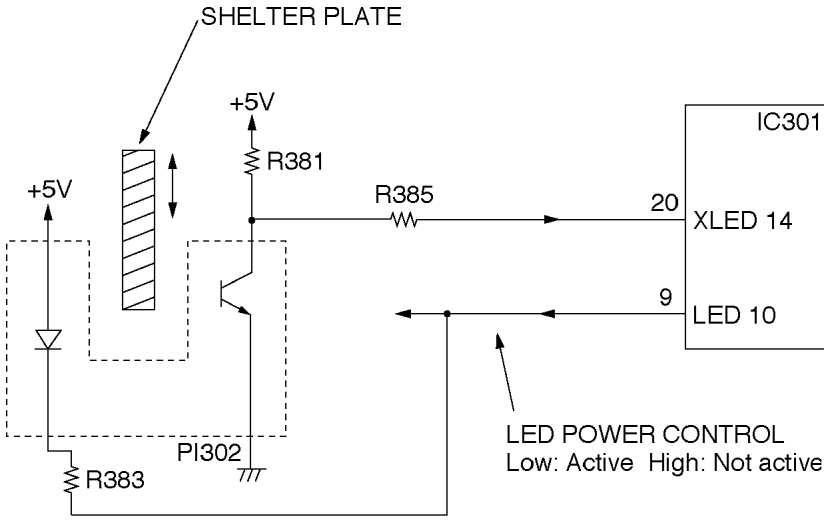


Operation Board

	Phototransistor	Signal (IC301-20 pin)
Out of the Read Position	OFF	High level
At the Read Position	ON	Low level

2. **[Document Sensor (PI302)]**

When a document is set, the shelter plate closes the sensor light, the phototransistor becomes OFF, and the input signal of IC301-20 pin (Operation) becomes a high level. When there is no document, the shelter plate is lifted, the phototransistor becomes ON, and the input signal of IC301-20 pin (Operation) becomes a low level. (When checking this sensor, the IC301-4 pin becomes a low level.)

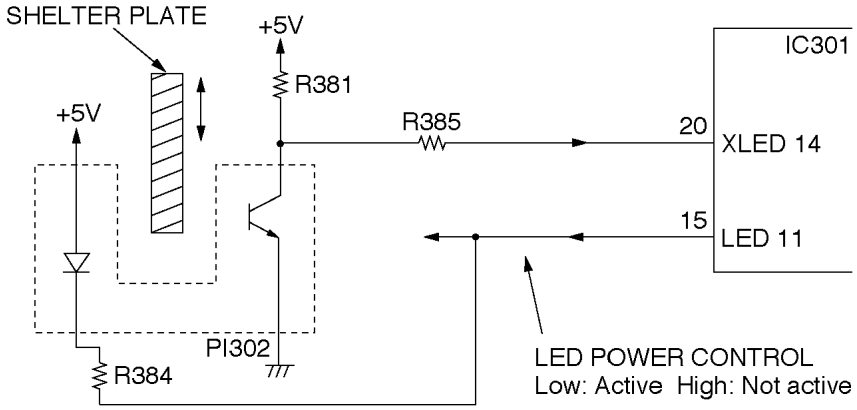


Operation Board

	Phototransistor	Signal (IC301-20 pin)
No document	ON	Low level
Set document	OFF	High level

3. **[Cover Open Sensor (PI303)]**

When the operation panel cover is closed, the shelter plate is lifted, the phototransistor becomes ON, and the input signal of IC301-20 pin (Operation) becomes a low level. When the cover is opened, the shelter plate shuts the sensor light, the phototransistor becomes OFF, and the input signal of IC301-20 pin (Operation) becomes a high level.



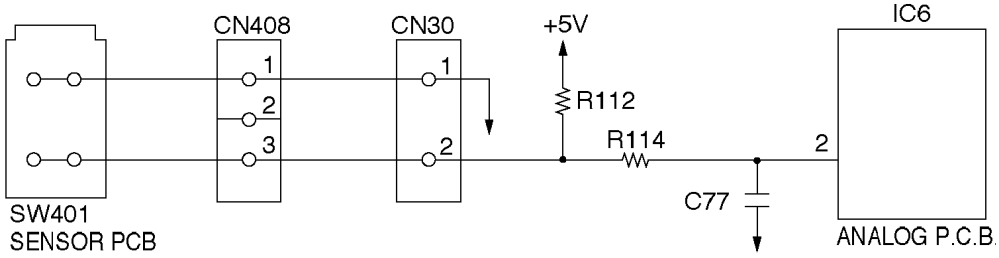
Operation Board

	Phototransistor	Signal (IC301-20 pin)
Open	OFF	High level
Closed	ON	Low level

4. **[Hook Switch (SW401)]**

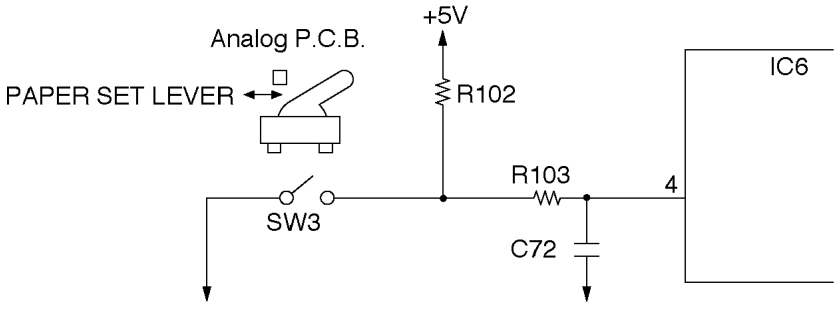
When the handset is lifted, the switch turns ON, and the signal at pin 2 of IC6 becomes low.

When the handset is brought back, the switch turns OFF, and the signal at pin 2 of IC6 becomes high.



5. **[Paper Set Switch (SW3)]**

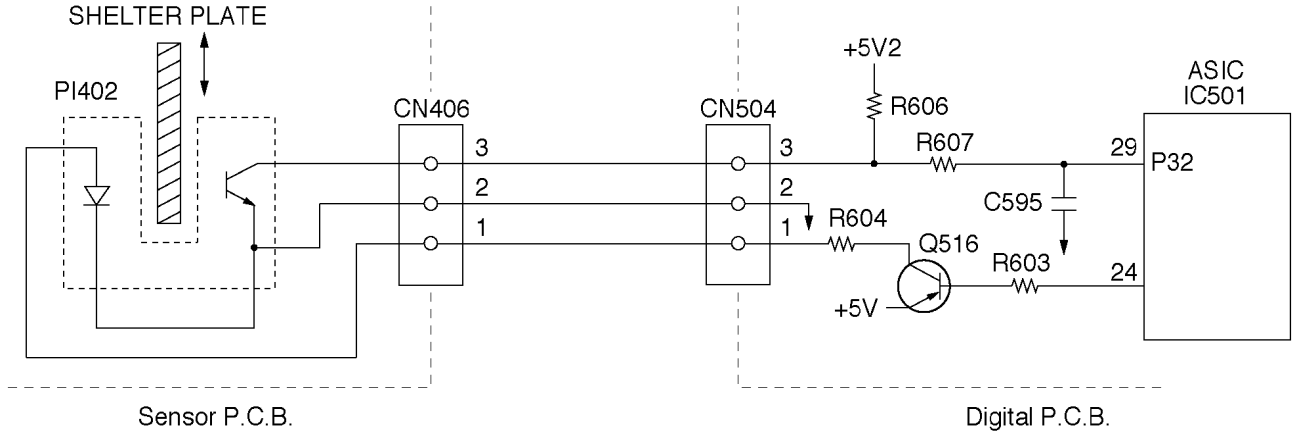
When the recording paper is set in place and the PAPER SET LEVER is pulled toward you, the plate is separated from the switch lever, causing the signal at IC6 pin 4 to become high. When the recording paper is installed and the PAPER SET LEVER is pushed back, the plate presses down on the switch lever, causing the signal at IC6 pin 4 to become low.



	Phototransistor	Signal (IC501-152 pin)
Set recording paper	OFF	High level
No recording paper	ON	Low level

6. **[Paper top Sensor (PI402)]**

When the recording paper is loaded on the print head, the shelter plate shuts the sensor light, and the phototransistor becomes OFF. The input signal of IC501-29 pin becomes a high level. Usually, the shelter plate is lifted, the phototransistor becomes ON, and the input signal of IC501-29 pin becomes a low level.

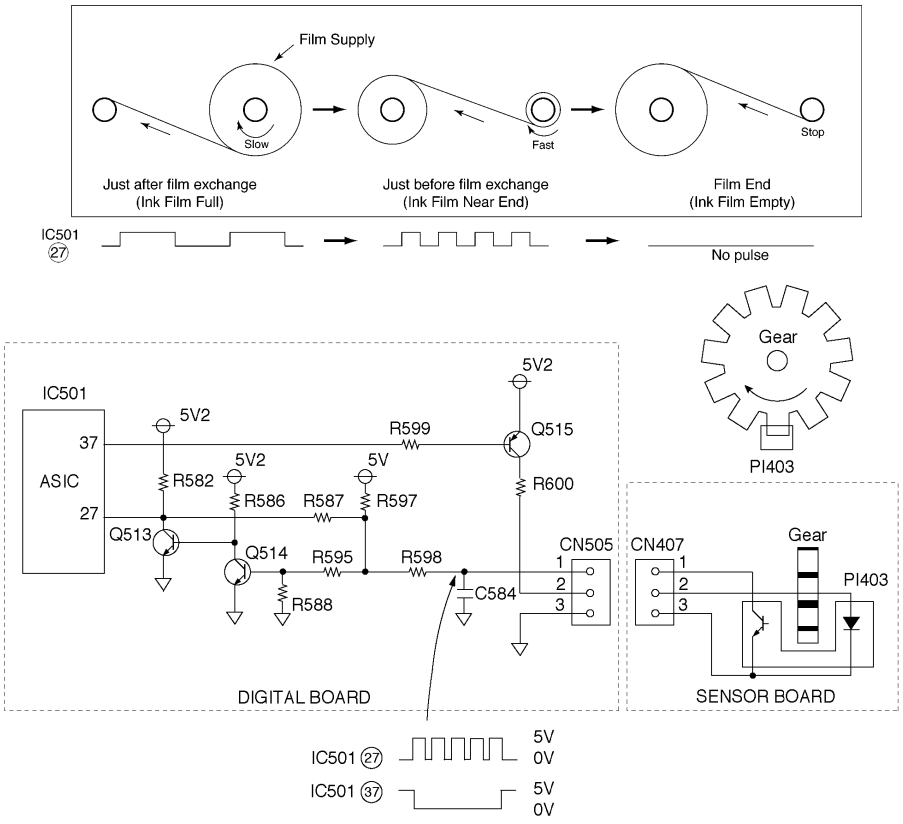


	Phototransistor	Signal (IC501-29 pin)
Set recording paper	OFF	High level
No recording paper	ON	Low level

7. **[Film End Sensor (PI403)]**

As the amount of the film decreases, the revolving speed of the rolled film becomes faster. When the film is used up, it comes off from the paper roll. The amount of the remaining film is measured by the revolving speed. When the film stops turning around, the sensor detects the film end.

The rotary encoder rotates slowly when the ink film is full (when printing), as shown in the diagram below. It rotates faster when it is near its end. Sensor PI403 converts the rotation of the rotary encoder into pulses and the amount of the remaining ink film is then calculated internally by the ASIC (IC501) and stored into memory. Then an error message such as "FILM EMPTY" or "FILM NEAR EMPTY" appears on the LCD display.



6.6. MODEM SECTION

6.6.1. FUNCTION

The unit uses a 1 chip modem (IC505) that serves as an interface between the control section for FAX transmission and reception and the telephone line. During a transmitting operation, the digital image signals are modulated and sent to the telephone line.

During a receiving operation, the analog image signals which are received via the telephone line are demodulated and converted into digital image signals. The communication format and procedures for FAX communication are standardized by CCITT. This 1 chip modem (IC505) has hardware which sends and detects all of the necessary signals for FAX communication.

It can be controlled by writing commands from the CPU (IC501: inside ASIC) to the register in the modem (IC505).

This modem (IC505) also sends DTMF signals, generates a call tone (from the speaker), and detects a busy tone and dial tones.

Overview of Facsimile Communication Procedures (CCITT Recommendation):

1. **ON CCITT (International Telegraph and Telephone Consultative Committee)**

   The No. XIV Group of CCITT, one of the four permanent organizations of the International Telecommunications Union (ITU), investigates and make recommendations on international standards for facsimiles.

2. **Definition of Each Group**

   - Group I (G1)

     Official A-4 size documents without using formats which reduce the band width of a signal are sent over telephone lines. Determined in 1968.

     Transmission for about 6 minutes at a scanning line density of 3.85 lines/mm.

   - Group II (G2)

     Using reduction technology in the modulation/demodulation format, an A-4 size document is sent at an official scanning line density of 3.85 lines/mm for about 3 minutes.

     Methods to suppress redundancy are not used.

     Determined in 1976.

   - Group III (G3)

     Method of suppressing redundancy in the image signal prior to modulation is used. An A-4 size document is sent within about one minute.

     Determined in 1980.

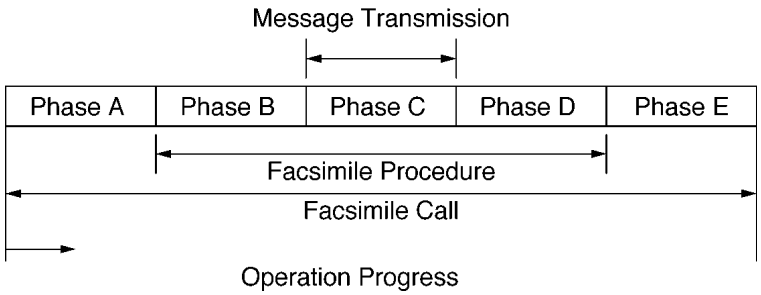
   - Group IV (G4)

     Transmission is via the data network. A method is provided for suppressing redundancy in signals prior to transmission, and error-free reception of transmission is possible.

     The scope of these facsimile applications is not limited simply to transmission of written statements. Through symbiotic linkages with other communication methods, it can be expected to expand to include integrated services.

3. **Facsimile Call Time Series**

As shown in the following diagram, the facsimile call time series is divided into five phases.



Phase A : Call setting

Call setting can be manual/automatic.

Phase B : Pre-message procedure

Phase B is a pre-processing procedure and sequence for confirming the status of the terminal, transmission route, etc., and for terminal control. It implements terminal preparation status, determines and displays terminal constants, confirms synchronization status, etc. and prepares for transmission of facsimile messages.

Phase C : Message transmission

Phase C is the procedure for the transmitting facsimile messages.

Phase D : Post message procedure

Phase D is the procedure for confirming that the message is completed and received. For continuous transmission, phase B or phase C is repeated for transmission.

Phase E : Call retrieval

Phase E is the procedure for call retrieval, that is for circuit disconnection.

4. **Concerning Transmission Time**

Transmission Time = Control Time + Image Transmission Time + Hold Time

Transmission time consists of the following.

Control time:

This is time at the start of transmission when the functions at the sending and receiving sides are confirmed, the transmission mode is established, and transmission and reception are synchronized.

Image transmission time:

This is the time required for the transmission of document contents (image data). In general, this time is recorded in the catalog, etc.

Hold time:

This is the time required after the document contents have been sent to confirm that the document was actually sent, and to check for telephone reservations and/or the existence of continuous transmission.

5. **Facsimile Standards**

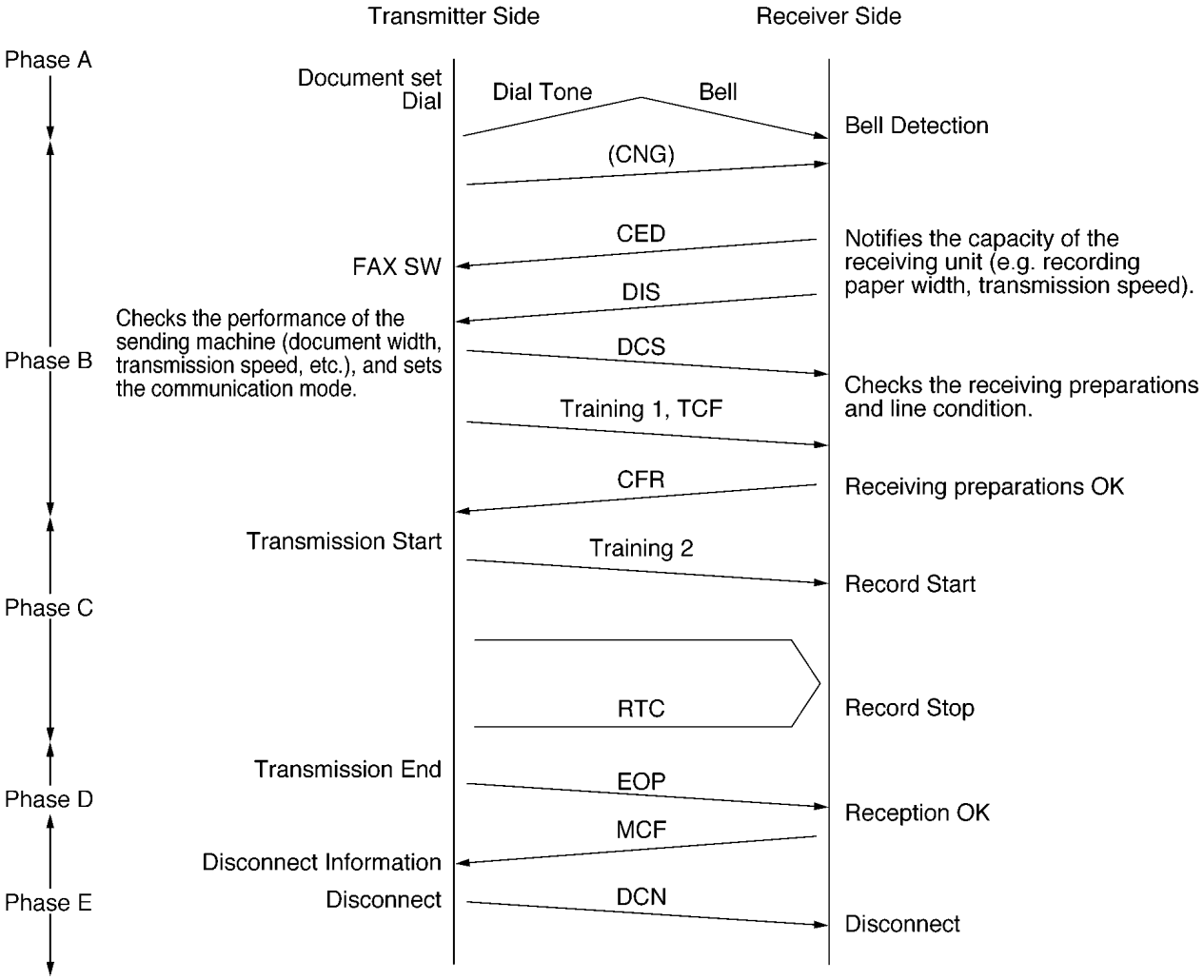
Item	Telephone Network Facsimile
	G3 Machine
Connection Control Mode	Telephone Network Signal Mode
Terminal Control Mode	T. 30 Binary
Facsimile Signal Format	Digital
Modulation Mode	PSK (V. 27 ter) or QAM (V. 29)
Transmission Speed	300 bps (Control Signal) 2400, 4800, 7200, 9600, 12000, 14400 bps (FAX Signal)
Redundancy Compression Process (Coding Mode)	1 dimension : MH Mode 2 dimension : MR Mode (K=2.4)
Resolution	Main Scan : 8 pel/mm Sub Scan : 3.85, 7.7l/mm
Line Synchronization Signal	EOL Signal
1 Line Transmission Time [ms/line]	Depends on the degree of data reduction. Minimum Value : 10, 20 Can be recognized in 40ms.

6. **Explanation of Communication and Compression Technology**

a. **G3 Communication Signals (T. 30 Binary Process)**

For G3 Facsimile communication, this is the procedure for exchanging control signals between the sending and receiving machines both before and after transmission of image signals.

Control signals at 300 bps FSK are: 1850 Hz...0, 1650Hz...1.
An example of a binary process in G3 communication is shown below.



Explanation of Signals

Control signals are comprised mainly of 8-bit identification signals and the data signals added to them. Data signals are added to DIS and DCS signals.

Signal.....DIS (Digital Identification Signal)
Identification Signal Format.....00000001

Function:
Notifies the capacity of the receiving unit. The added data signals are as follows.

Signal.....DCS (Digital Command Signal)
Identification Signal Format.....X1000001

Example (Some models do not support the following items.):

Bit No.	DIS/DTC	DCS
1	Transmitter --- T.2 operation	
2	Receiver --- T.2 operation	Receiver --- T.2 operation
3	T.2 IOC = 176	T.2 IOC = 176
4	Transmitter --- T.3 operation	
5	Receiver --- T.3 operation	Receiver --- T.3 operation
6	Reserved for future T.3 operation features	
7	Reserved for future T.3 operation features.	
8	Reserved for future T.3 operation features.	

Bit No.	DIS/DTC	DCS
9	Transmitter --- T.4 operation	
10	Receiver --- T.4 operation	Receiver --- T.4 operation
11, 12, 13, 14 0, 0, 0, 0 0, 1, 0, 0 1, 0, 0, 0 1, 1, 0, 0 0, 0, 1, 0 0, 1, 1, 0 1, 0, 1, 0 1, 1, 1, 0 0, 0, 0, 1 0, 1, 0, 1 1, 0, 0, 1 1, 1, 0, 1 0, 0, 1, 1 0, 1, 1, 1 1, 0, 1, 1 1, 1, 1, 1	Data signaling rate V.27 ter fall back mode V.27 ter V.29 V.27 ter and V.29 Not used Reserved Not used V.27 ter and V.29 and V.33 Not used Reserved Not used V.27 ter and V.29 and V.33 and V.17 Not used Reserved Not used Reserved	Data signaling rate 2400 bit/s, V.27 ter 4800 bit/s, V.27 ter 9600 bit/s, V.29 7200 bit/s, V.29 14400 bit/s, V.33 12000 bit/s, V.33 Reserved Reserved 14400 bit/s, V.17 12000 bit/s, V.17 9600 bit/s, V.17 7200 bit/s, V.17 Reserved Reserved Reserved Reserved
15	R8×7.7 lines/mm and/or 200×200 pels/25.4mm	R8×7.7 lines/mm and/or 200×200 pels/25.4mm
16	Two-dimensional coding capability	Two-dimensional coding capability
17, 18 (0, 0) (0, 1) (1, 0) (1, 1)	Recording width capabilities 1728 picture elements along scan line length of 215 mm ± 1% 1728 picture elements along scan line length of 215 mm ± 1% 2048 picture elements along scan line length of 255 mm ± 1% 2432 picture elements along scan line length of 303 mm ± 1% 1728 picture elements along scan line length of 215 mm ± 1% 2048 picture elements along scan line length of 255 mm ± 1% Invalid	Recording width 1728 picture elements along scan line length of 215 mm ± 1% 2432 picture elements along scan line length of 303 mm ± 1% 2048 picture elements along scan line length of 255 mm ± 1% Invalid
19, 20 (0, 0) (0, 1) (1, 0) (1, 1)	Maximum recording length capability A4 (297 mm) Unlimited A4 (297 mm) and B4 (364 mm) Invalid	Maximum recording length A4 (297 mm) Unlimited B4 (364 mm) Invalid
21, 22, 23 (0, 0, 0) (0, 0, 1) (0, 1, 0) (1, 0, 0) (0, 1, 1) (1, 1, 0) (1, 0, 1) (1, 1, 1)	Minimum scan line time capability of the receiver 20 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$ 40 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$ 10 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$ 5 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$ 10 ms at 3.85 l/mm: $T_{7.7} = 1/2\ T_{3.85}$ 20 ms at 3.85 l/mm: $T_{7.7} = 1/2\ T_{3.85}$ 40 ms at 3.85 l/mm: $T_{7.7} = 1/2\ T_{3.85}$ 0 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$	Minimum scan line time 20 ms 40 ms 10 ms 5 ms 0 ms
24	Extend field	Extend field
25	2400 bit/s handshaking	2400 bit/s handshaking
26	Uncompressed mode	Uncompressed mode
27	Error correction mode	Error correction mode
28	Set to "0".	Frame size 0 = 256 octets 1 = 64 octets
29	Error limiting mode	Error limiting mode
30	Reserved for G4 capability on PSTN	Reserved for G4 capability on PSTN
31	T.6 coding capability	T.6 coding enabled
32	Extend field	Extend field
33 (0) (1)	Validity of bits 17, 18 Bits 17, 18 are valid Bits 17, 18 are invalid	Recording width Recording width indicated by bits 17, 18 Recording width indicated by this field bit information
34	Recording width capability 1216 picture elements along scan line length of 151 ± mm 1%	Middle 1216 elements of 1728 picture elements
35	Recording width capability 864 picture elements along scan line length of 107 ± mm 1%	Middle 864 elements of 1728 picture elements
36	Recording width capability 1728 picture elements along scan line length of 151 ± mm 1%	Invalid
37	Recording width capability 1728 picture elements along scan line length of 107 ± mm 1%	Invalid
38	Reserved for future recording width capability.	
39	Reserved for future recording width capability.	
40	Extend field	Extend field
41	R8×15.4 lines/mm	R8×15.4 lines/mm
42	300×300 pels/25.4 mm	300×300 pels/25.4 mm

Bit No.	DIS/DTC	DCS
43	R16×15.4 lines/mm and/or 400×400 pels/25.4 mm	R16×15.4 lines/mm and/or 400×400 pels/25.4 mm
44	Inch based resolution preferred	Resolution type selection "0" : neritic based resolution "1" : inch based resolution
45	Metric based resolution preferred	DonÕt care
46	Minimum scan line time capability for higher resolutions "0" : $T_{15.4} = T_{7.7}$ "1" : $T_{15.4} = 1/2T_{7.7}$	DonÕt care
47	Selective Polling capability	Set to "0".
48	Extend field	Extend field

Note 1 - Standard facsimile units conforming to T.2 must have the following capability : Index of cooperation (IOC)=264.

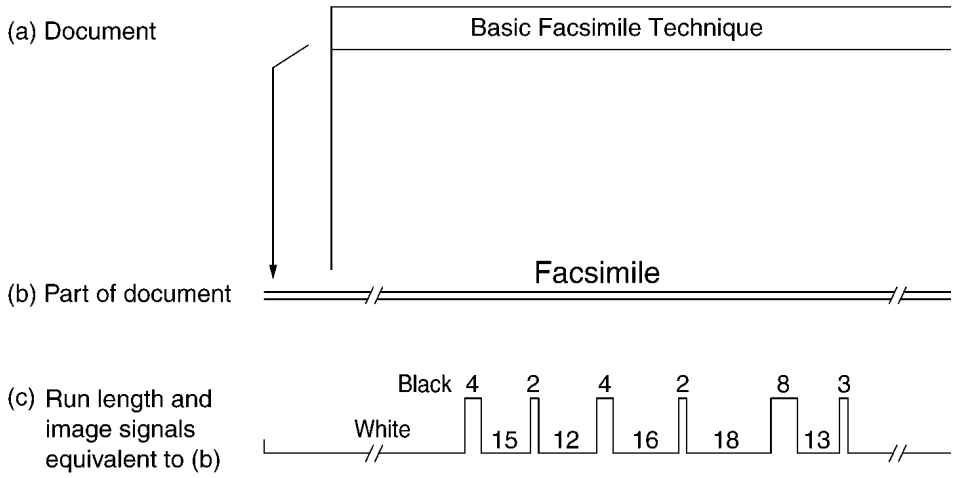
Note 2 - Standard facsimile units conforming to T.3 must have the following capability : Index of cooperation (IOC)=264.

Note 1 - Standard facsimile units conforming to T.4 must have the following capability : Paper length=297 mm.

Signal	Identification Signal Format	Function
Training 1	————————	A fixed pattern is transmitted to the receiving side at a speed (2400 to 9600 bps) designated by DCS, and the receiving side optimizes the automatic equalizer, etc., according to this signal.
TCF (Training Check)	————————	Sends 0 continuously for 1.5 seconds at the same speed as the training signal.
CFR (Confirmation to Receive)	X0100001	Notifies the sending side that TCF has been properly received. If TCF is not properly received, FTT (Failure To Train) X0100010 is relayed to the sender. The sender then reduces the transmission speed by one stage and initiates training once again.
Training 2	————————	Used for reconfirming the receiving side like training 1.
Image Signal	Refer to the next page.	————————
RTC (Return to Control)	————————	Sends 12 bits (0...01 × 6 times) to the receiver at the same speed as the image signal and notifies completion of transmission of the first sheet.
EOP (End of Procedure)	X1110100	End of one communication
MCF (Message Confirmation)	X0110001	End of 1 page reception
DCN (Disconnect)	X1011111	Phase E starts.
MPS (Multi-Page Signal)	X1110010	Completion of transmission of 1 page. If there are still more documents to be sent, they are output instead of EOP. After MCF reception, the sender transmits an image signal of the second sheet.
PRI-EOP (Procedural Interrupt-EOP)	X1111100	If there is an operator call from the sender, it is output after RTC.
PIP (Procedural Interrupt Positive)	X0110101	This is output when an operator call is received.

b. **Redundancy Compression Process Coding Mode**

This unit uses one-dimensional MH format.



Modified Huffman (MH) Code		
Run length	Code for White Line	Code for Black Line
0	00110101	000011011
1	000111	010
2	0111	11
3	1000	10
4	1011	011
5	1100	0011
6	1110	0010
7	1111	00011
8	10011	000101
9	10100	000100
10	00111	0000100
11	01000	0000101
12	001000	0000111
13	000011	00000100
14	110100	00000111
15	110101	000011000
16	101010	0000010111
17	101011	0000011000
18	0100111	0000001000

(d) Codification of (c) according to MH formula

00110111101010 (White 400) 011 (Black 4) 110101 (White 15) 11 (Black 2) 001000 (White 12) 011 (Black 4) 101010 (White 16)

11 (Black 2) 0100111 (White 18) 000101 (Black 8) 000011 (White 13) 10 (Black 3)

(c) Total bit number before MH codification (497 bit)
(d) Total bit number after MH codification (63 bit)

6.6.2. MODEM CIRCUIT OPERATION

The modem (IC505) has all the hardware satisfying the CCITT standards mentioned previously. When the ASIC IC501 (91) is brought to a low level, the modem (IC505) is chip-selected and the resistors inside IC are selected by the select signals from ASIC (IC501) MD0~MD7(pin 78~83,86,88). Commands are written through the data bus, and all processing is controlled by the ASIC (IC501) according to CCITT procedures. Here, the INT signal dispatched from IRQ (pin 180,121 of IC505) to the ASIC (IC501) implements post processing. This modem (IC505) has an automatic application equalizer. With training signal 1 or 2 at the time of G3 reception, it can automatically establish the optimum equalizer. The modem (IC505) operates with the 32.256 MHz clock (X901).

1. **Facsimile Transmission/DTMF Line Send**

   The digital image data on the data bus is modulated in the modem (IC505), and sent from pin 69 , and the NCU section to the telephone line.

   Refer to **2.3.3.5. Analog Board Section.**

2. **Facsimile Reception**

   The analog image data which is received from the telephone line passes through the NCU section and enters pin 60 of the modem (IC505). The signals that enter pin 60 of the modem (IC505) are demodulated in the board to digital image signals, then placed on the data bus. In this case, the image signals from the telephone line are transmitted serially. Hence, they are placed on the bus in 8 bit units. Here, the internal equalizer circuit reduces the image signals to a long-distance receiving level. This is designed to correct the characteristics of the frequency band centered around 3 kHz and maintain a constant receiving sensitivity. It can be set in the service mode.

   Refer to **2.3.3.5. Analog Board Section.**

3. **DTMF Transmission (Monitor tone)**

   The DTMF signal generated in the modem (IC505) is output from pin 69, and the NCU section to the telephone line the same as facsimile transmission signals.

   (DTMF Monitor Tone)

   Refer to **2.3.3.5. Analog Board Section.**

4. **Busy/Dial Tone Detection**

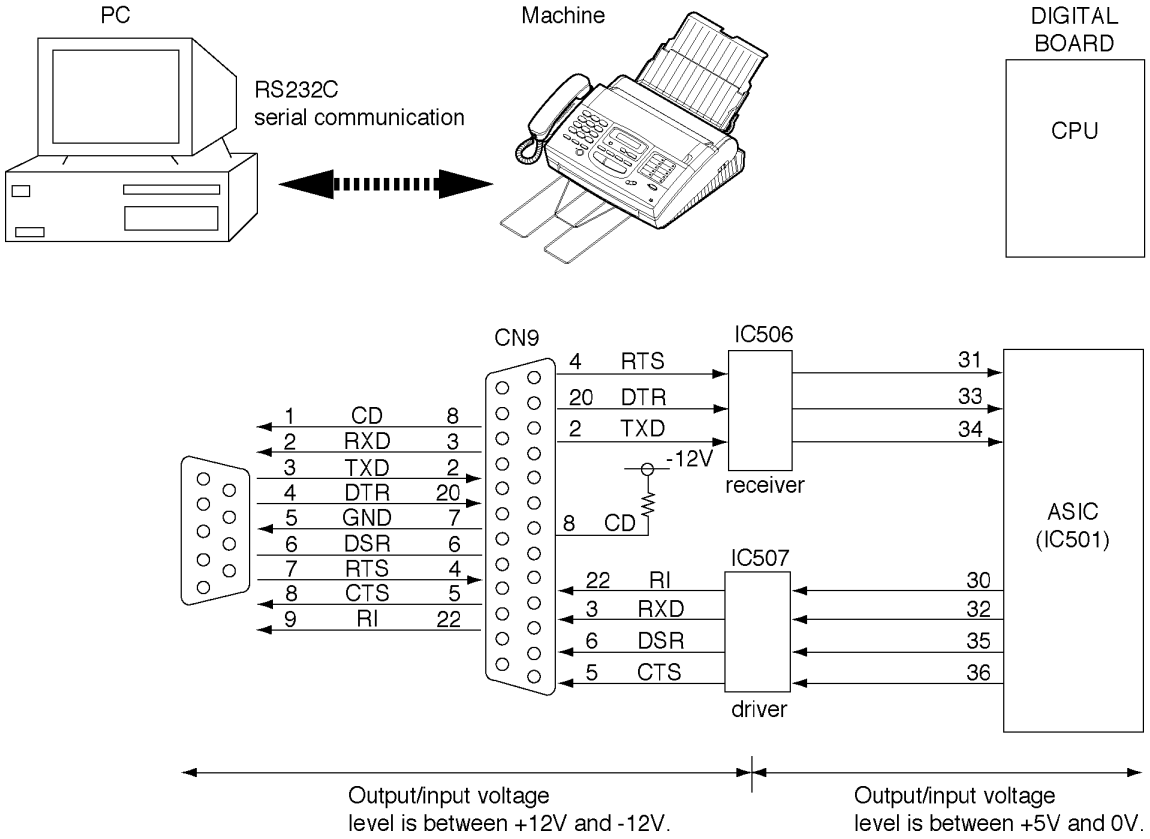
   The path is the same as FAX receiving. When it is detected, the carrier detect bit of the resistor in the modem (IC505) becomes 1, and this status is monitored by ASIC (IC501).

6.7. RS-232C SECTION : RS-232C serial communication (KX-FM330 Only)

6.7.1. OUTLINE

This model has a communication port designed for RS-232C serial communication. (The EIA Standards specify the interface cable type (No. RS232C) and the voltage levels.)

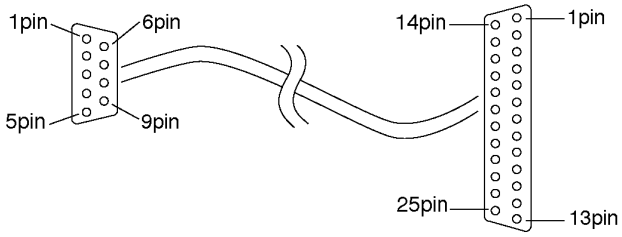
You can connect the FAX machine to a printer (200dpi), scanner and fax modem with the interface cable and the attached software (floppy disk). This PC interface enables you to store the transmitted/received data into memory (on your PC hard disk) and to manage the data as files.



6.7.2. ELECTRICAL SPECIFICATIONS

Electrical specifications	
Output voltage level	+12V space-12V mark
Output impedance	Ro>300Ω(Excepting CD: 2kΩ)
Input impedance	7kΩ>Ri>3kΩ
Communication speed	~19.2kbps

6.7.3. CABLE TYPE



Use modem cable or RS-232C data communication cable. (Cable type is specified in Operating Instructions.)

Note:

The open circuit driver voltage (output) of this machine is +12V~-12V. The minimum input signal voltage must fall outside the transition region of ±3V. The output voltage range that is terminated with a load between 3kΩ and 7kΩ will be between ±5V and ±12V.

6.8. DESCRIPTION OF BLOCK DIAGRAM IN ANALOG SECTION

1. **Function**

The analog section is composed of the following circuits.

1 Interface circuit to connect with telephone line (NCU)

2 Analog gate array (IC5) (1) to change the circuit configuration for Tx/Rx signals of speaker phone,

Tx/Rx signals of handset, and fax signals, (2) to adjust volume of speaker, (3) to control other circuits such as NCU, and (4) to read information sent from sensors and NCU.

Following is the detailed description of each circuit.

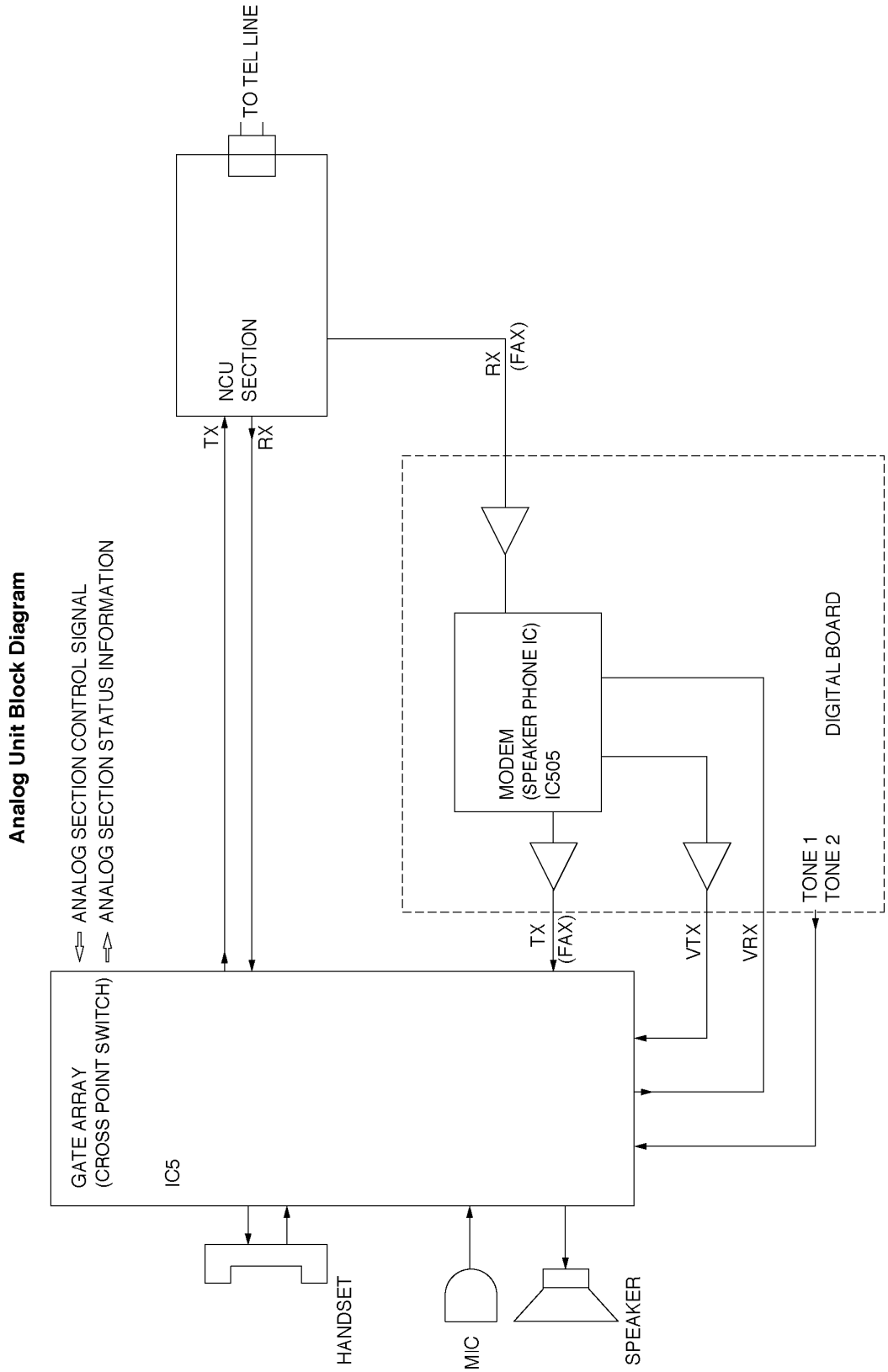
[NCU]: Network Control Unit

The NCU comprises of the following; DC loop forming circuit to connect with the telephone line; Switching circuit for other interconnected telephones; Bell detection circuit; Pulse dial generation circuit; Extension line phone off-hook detection circuit; Sidetone circuit; Remote fax activation circuit. Refer to **6.9.NCU SECTION** for the details.

[Analog gate array (IC5)]

The cross-point switch installed in this IC makes it possible to change the circuit configuration for any analog signals such as the fax signals sent from the digital MODEM board or the Tx/Rx signals for speaker phone. In addition, this analog gate array integrates a handset circuit, signal level adjusting circuit, electronic volume, input/output ports, etc. This IC is controlled by ASIC (IC501) on the digital board.

6.8.1. ANALOG UNIT BLOCK DIAGRAM



6.9. NCU SECTION

6.9.1. GENERAL

This section is the interface between the telephone line and external telephone. It is composed of an EXT. TEL line relay (RL1), bell detection circuit, pulse dial circuit, line amplifier and sidetone circuits and a multiplexer.

6.9.2. EXT. TEL. LINE RELAY (RL1)

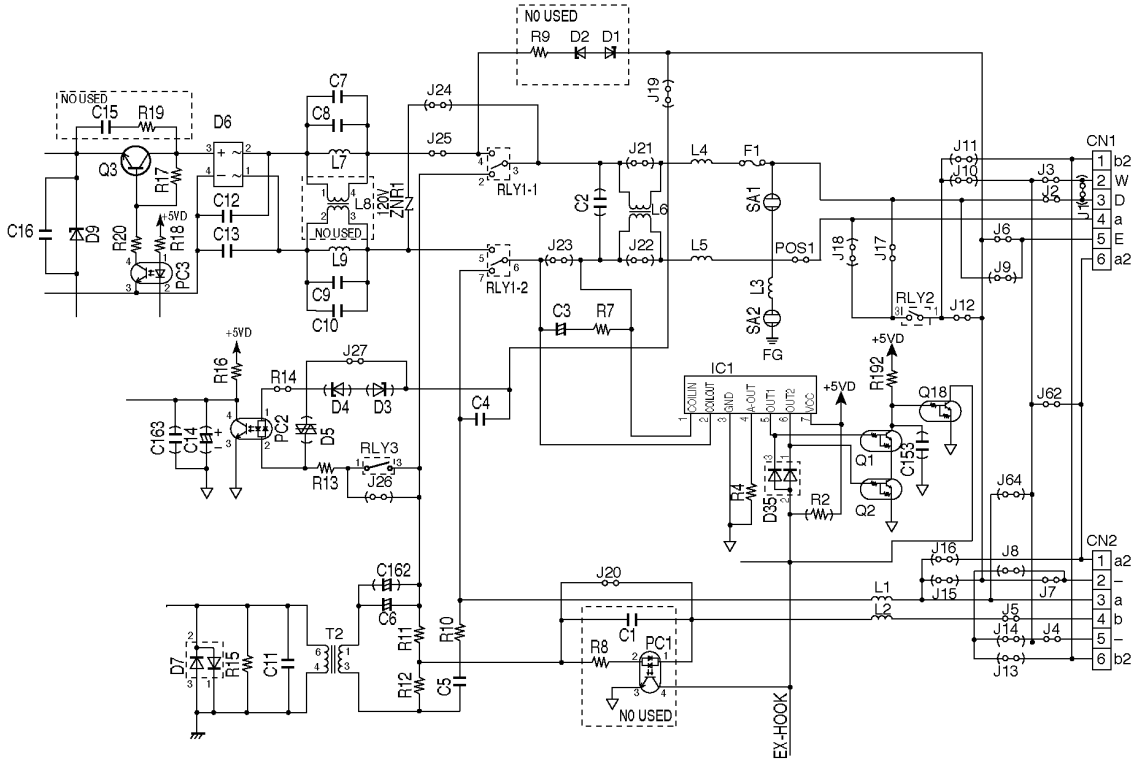
1. **Circuit Operation**

   Normally, this relay switches to the external telephone side (break) and switches to the open side (make) when the unit starts facsimile communication.

   { IC5 (26) High Level → Q14 ON → RL1 (make)

6.9.3. TELEPHONE LINE CONNECTION

Circuit Diagram

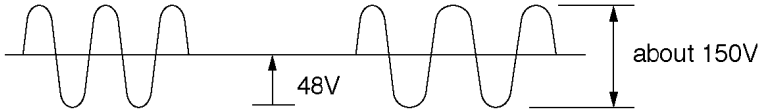


6.9.4. BELL DETECTION CIRCUIT

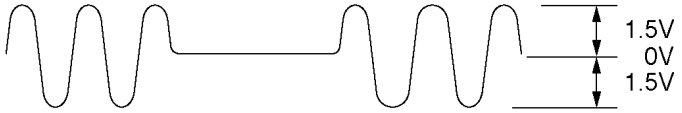
1. **Circuit Operation**

The signal wave form of each section is indicated below. Signal (low level section) input to pin 29 of gate array IC5 is read out at the CPU and judged as a bell.

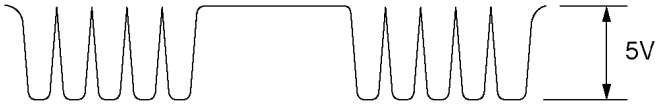
Between A wire and B wire



Between PC2 (1) and (2)



PC2 (4)/Gate Array IC5(29)



TEL LINE → PC2 (1,2) → PC2 (4) → IC5(29)

6.9.5. PULSE DIAL CIRCUIT

1. **Circuit Operation**

In the OFF-HOOK condition, the photocoupler PC3 pin (2) is a low level by the IC5 pin (2), and the PC3 pin (4) is a low level if Q3 is ON. During the pulse dial operation, the PC3 pin (2) becomes a high level by the IC5 pin (2), so that the PC3 pin (4) becomes a high level. If Q3 is ON, then the line is ON and vice versa. The high/low control for the IC5 pin (2) makes the pulse dial operation possible.

- IC5 (2) High Level → PC3 (2) High Level → PC3(4) High Level → Q3 OFF → TEL LINE OFF

- IC5 (2) Low Level → PC3 (2) Low Level → PC3(4) Low Level → Q3 ON → TEL LINE ON

6.9.6. SIDE TONE CIRCUIT

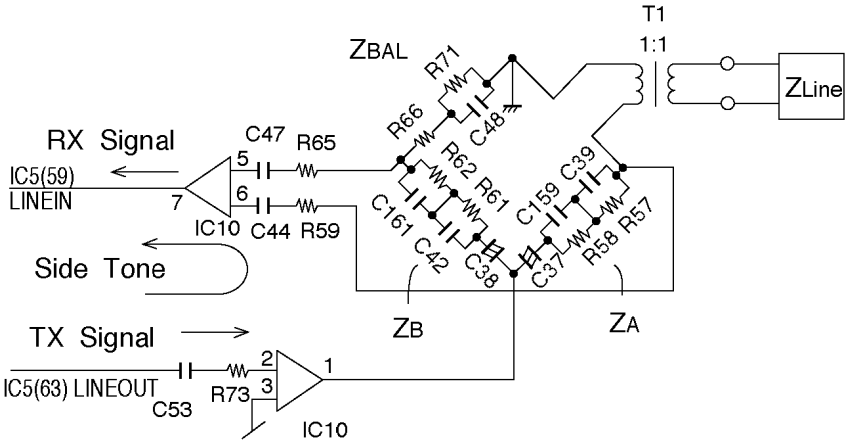
1. **Function**

   A sidetone is the returning of the TX signal to the RX signal. The sidetone circuit uses a bridge circuit to attenuate the sidetone. Howling may occur if the attenuation of the sidetone is inadequate.

2. **Circuit Operation**

   The TX signal is output to the circuit along the route from the IC10-1pin → C37 → R58 → R57 → T1 → TEL LINE. However, if balance is lost in the bridge as shown below, a voltage occurs between the IC10-5 pin and 6 pin and a sidetone results. Because the balance cannot be maintained completely at all frequencies in the audio range, some sidetones always occur.

Circuit Diagram



Conditions for bridge balance

$Z_A \times Z_{BAL} = Z_B \times Z_{LINE}$

$(Z_A = Z_B)$

$Z_{BAL} = Z_{LINE}$

$\times$ Z_{LINE}: Tel line blockage

6.9.7. REMOTE FAX ACTIVATION CIRCUIT

1. **Function**

   Another telephone connected to same line activates the unit to the FAX mode by using a DTMF signal.

2. **Signal Path**

   TEL Line → T2 → C115 → R154 → IC5 (61→67) → R167 → C134 → IC2 (10 → 11) → C68 → CN7 (9) → {CN501 (9) → C701 → IC801(3→4) → C943 → J604 → C603 → IC5(60)}

   { }.....Digital board

6.10. ITS (Integrated telephone System) and MONITOR SECTION

6.10.1. GENERAL

The general ITS operation is performed by the special IC505 which has a handset circuit. The alarm tone, the key tone, and the beep are output from the ASIC IC501 (digital board). During the pulse dial operation, the monitor tone is output from the ASIC IC501.

6.10.2. SPEAKER PHONE CIRCUIT

1. **Function**

   The circuit controls the automatic switching of the transmitted and received signals, to and from the telephone line, when the unit is used in the hands-free mode.

2. **Circuit Operation**

   The speakerphone can only provide duplex.

3. **Signal path**

   Refer to **2.3.3.5. Analog Board Section**.

6.10.3. HANDSET CIRCUIT

1. **Function**

   This circuit controls the conversation over the handset, i.e. the transmitted and received voices to and from the handset.

2. **Signal path**

   Refer to **2.3.3.5. Analog Board Section**.

6.10.4. MONITOR CIRCUIT FOR EACH SIGNALS

1. **Function**

   This circuit monitors various tones, such as **1** DTMF tone, **2** Alarm/Beep/Key tone/Bell.

2. **Signal path**

   Refer to **2.3.3.5. Analog Board Section**.

6.11. ATAS (Automatic Telephone Answering System) SECTION

1. **Function**

   The ATAS main operation is performed by the special IC505 (MODEM). IC901 (FLASH MEMORY)´s control signals are input from ASIC IC501.

   a. Greeting/Message Recording
   b. ICM Recording
   c. Greeting/Message/ICM play to speaker
   d. Greeting/Message/ICM play to Tel Line
   e. Vox Detection

2. **Signal Path**

   Refer to **2.3.3.5. Analog Board Section**.

6.12. SPECIAL CIRCUIT ON THE ANALOG BOARD

6.12.1. CURRENT DETECTION CIRCUIT

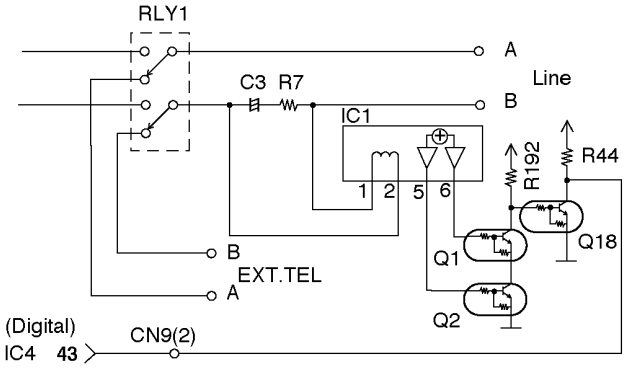
1. **Function**

   This circuit detects whether the circuit current is flowing or not. It is also used for CPC detection and Ext. Tel Hook detection.

2. **Circuit Operation**

   If a circuit current of 10 mA or more flows in the IC1 coil when the unit or Ext. Tel is OFF-hook, the IC1 internal sensor detects this current. Then, depending on the direction of the current, the IC1-5 pin or 6 pin switches to a low level. Then, Q1 or Q2 is turns off, Q18 turns on, and the Gate Array IC4-43 pin on the digital board switches to a low level. If the line is cut off, the IC4-43 pin switches to a high level.

Circuit Diagram



6.12.2. LOW PASS FILTER

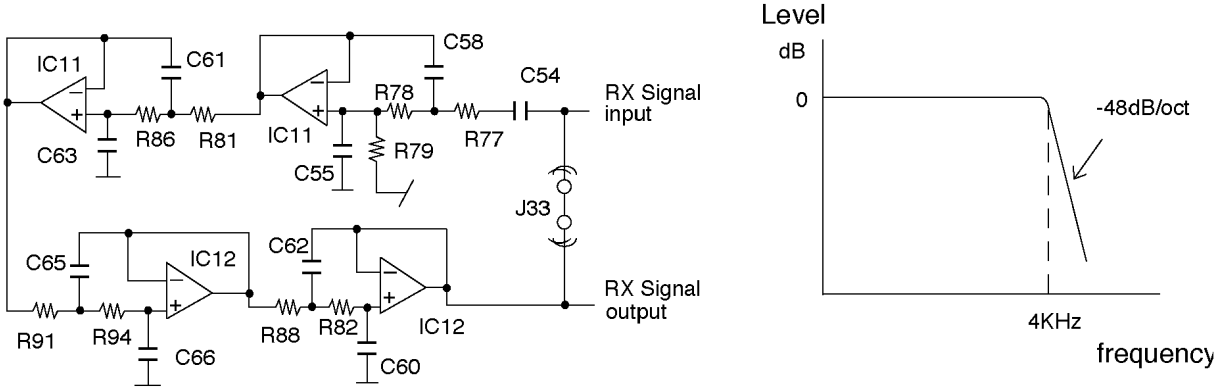
1. **Function**

   This circuit is only incorporated into the products designed for the German market. Products for other markets are shorted by J33. This low pass filter attenuates the 16-kHz account signal from the commutator to eliminate influence on the conversation and communications.

2. **Circuit Operation**

   This low pass filter is an eighth-order active filter, and the cutoff frequency is approximately 4 kHz.

Circuit Diagram

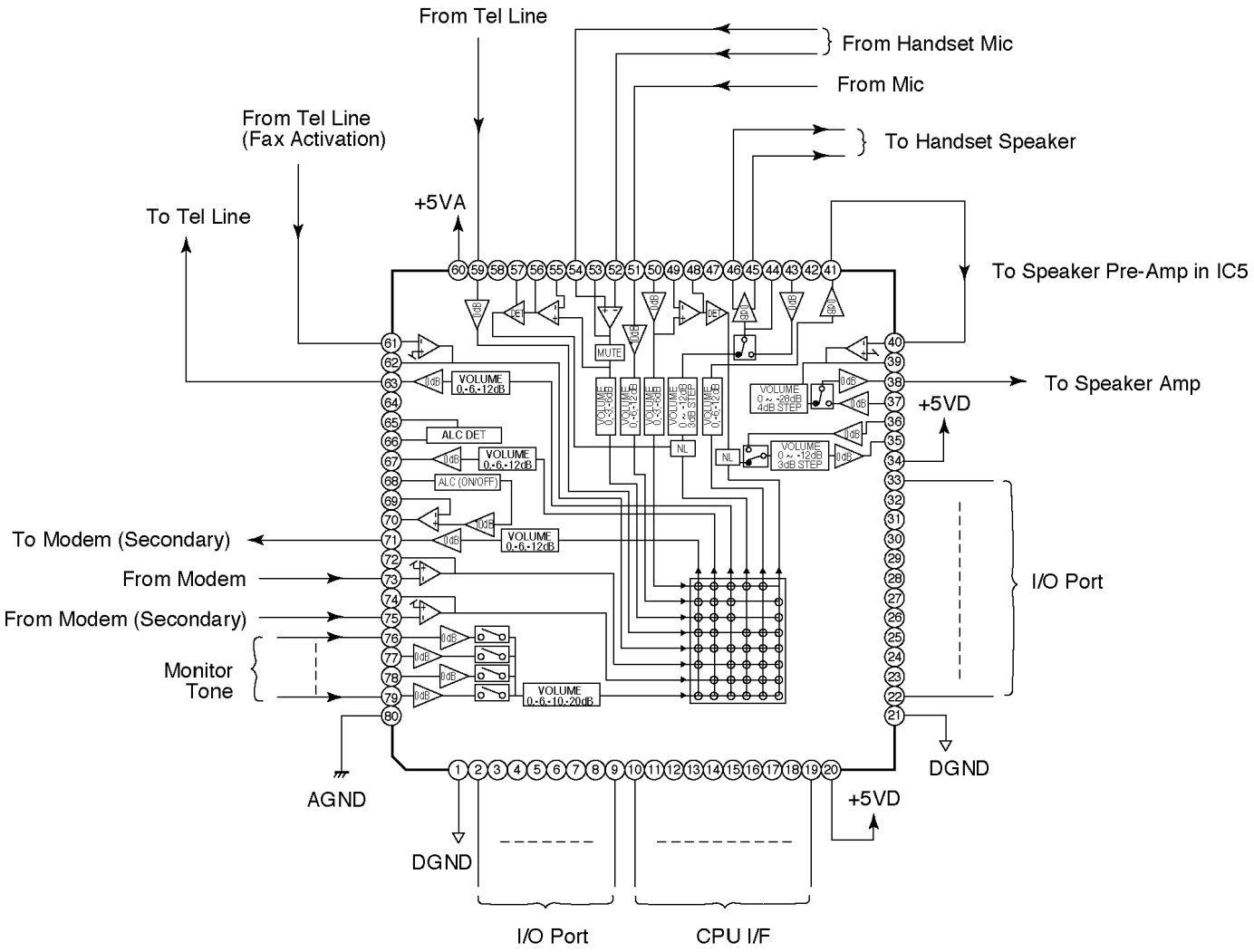


6.13. ANALOG GATE ARRAY (IC5 on the Analog Board)

This IC can perform signal route switching and level adjustments for various types of analog signals. This IC is a custom IC incorporating an I/O port. This IC incorporates a cross-point switch, electronic volume, ALC circuit for recording, sidetone attenuation circuit, and an I/O port.

6.13.1. INTERNAL CONNECTIONS

Circuit Diagram



6.13.2. EXPLANATION OF ANALOG GATE ARRAY (IC103 on the Analog Board)

Pin No.	Name	Function	I/O	Pin No.	Name	Function
1	DGND	GND (Digital)	—	41	PROUT1	PRE-AMP1 output
2	BREAK	Controls pulse dialing	O	42	AGND	GND (Analog)
3	MDMRX	FAX RX Signal ON/OFF	O	43	RTONE	Not Used
4	EX-HOOK	Detects EXT. TEL OFF-hook	I	44	RIN	Handset receiver AMP input
5	DCN	Detects parallel TEL OFF-hook	I	45	ROUT1	Handset receiver AMP output 1
6	NOT USED	----------	I	46	ROUT2	Handset receiver AMP output 2
7	NOT USED	----------	I	47	NOT USED	----------
8	E-RECALL	Controls earth recall relay	O	48	NOT USED	----------
9	P-SHORT	Improves wave form of pulse dialing	O	49	NOT USED	----------
10	WR	Writes enable	I	50	NOT USED	----------
11	RD	Reads enable	I	51	MICIN	MIC AMP input
12	CS	Chip select	I	52	HSMIC-	Handset MIC AMP (-) input
13	D0	Data In/Out	I/O	53	HSMICOUT	Handset MIC AMP output
14	D1	Data In/Out	I/O	54	HSMIC+	Handset MIC AMP (+) input
15	D2	Data In/Out	I/O	55	NL2IN	Side tone suppressing AMP input
16	D3	Data In/Out	I/O	56	NL2OUT	Side tone suppressing AMP output
17	D4	Data In	I	57	NL2IN	Suppressing sensitivity adjustment
18	RS	Resistor select	I	58	VREF	Reference voltage output
19	RESET	Reset this IC	I	59	LINEIN	Line RX-AMP input
20	DVDD	5V (Digital)	—	60	VCC	5V (Analog)
21	DGND	GND (Digital)	—	61	EXIN	EXT AMP input
22	BELL-RLY	Controls bell relay (RLY3)	O	62	EXOUT	EXT AMP output
23	NOT USED	----------	O	63	LINEOUT	Line TX-AMP output
24	NOT USED	----------	I	64	VREF2	Reference voltage output
25	SD	Serial data from DTMF receiver	I	65	ALCIN	ALC-AMP input
26	LINE-RLY	Controls line relay (RLY1)	O	66	ALCDET	Attack/recovery time adjustment
27	SP-MUTE	Mutes control to speaker AMP (IC3)	O	67	PROUT2	PRE-AMP2 output
28	NOT USED	----------	I	68	RECIN	Recording signal input
29	BELL	Detects bell signal	I	69	RECPRIN	Recording PRE-AMP input
30	MDMSRX	SP-Phone RX Signal ON/OFF	O	70	RECPROUT	Recording PRE-AMP output
31	MDMTRX	TAM RX Signal ON/OFF	O	71	LSRXOUT	SP-Phone MIC signal output
32	PT-HOOK	Detects parallel TEL ON-Hook	I	72	PLYOUT	Play AMP output
33	NOT USED	----------	O	73	PLYIN	Play AMP input
34	DVDD	5V (DIGITAL)	—	74	LSTXOUT	SP-Phone speaker signal output
35	A-OUT	RX signal output to DTMF receiver		75	LSTXIN	SP-Phone speaker signal input
36	NOT USED	----------		76	TONE IN1	DTMF monitor signal input
37	NOT USED	----------		77	TONE IN2	Alarm/keytone input
38	SPOUT	Speaker AMP output		78	TONE IN3	Ringing signal input
39	SPPROUT	Speaker PRE-AMP output		79	TONE IN4	Pulse dial monitor signal input
40	SPPRIN	Speaker PRE-AMP (-) input		80	AGND	GND (Analog)

6.14. OPERATION BOARD SECTION

The unit consists of a LCD (Liquid crystal display), KEYs and LEDs (light-emitting diodes). They are controlled by the Gate Array (IC301) and ASIC (IC501: on the DIGITAL BOARD). (Fig.-a)

The key matrix table is shown blow.

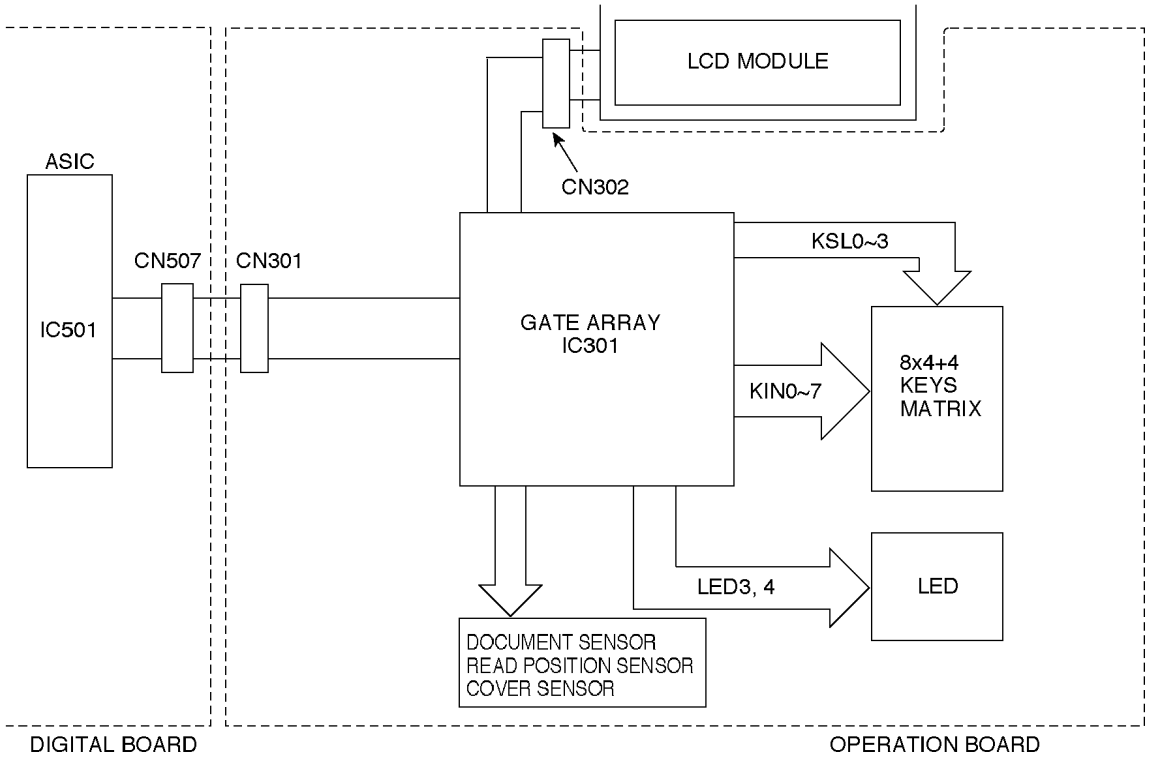


Fig-a

Key Matrix

	KIN0	KIN1	KIN2	KIN3	KIN4	KIN5	KIN6	KIN7
KSL0	SW301 DIRECTORY PROGRAM	SW305 PLAY MESSAGES	SW309 STOP	SW313 0	SW317 7	SW321 8	SW325 9	SW329 REDIAL/PAUSE
KSL1	SW302 ONE TOUTCH 1, 6	SW306 FILM REMAINING	SW310 START/SET/COPY	SW314 DIGITAL SP-PHONE	SW318 4	SW322 5	SW326 6	SW330 FLASH
KSL2	SW303 ONE TOUTCH 2, 7	SW307 ONE TOUTCH 4, 9	SW311 LOWER	SW315 #	SW319 VOL DOWN	SW323 VOL UP	SW327 HELP	SW331 SEARCH CALLER ID
KSL3	SW304 ONE TOUTCH 3, 8	SW308 ONE TOUTCH 5, 10	SW312 MUTE	SW316 *	SW320 1	SW324 2	SW328 3	SW332 AUTO ANSWER

	LED7	LED10
XLD12	SW336 MENU	SW331 CALL ID SEARCH
XLD13	SW334 RESOLUTION	SW333 ERASE
XLD15		SW337 RECORD

SENSOR

	LED7	LED10	LED11
XLD14	PI382 DOCUMENT SET SENSOR	PI302 DOCUMENT TOP	PI303 COVER OPEN

LED

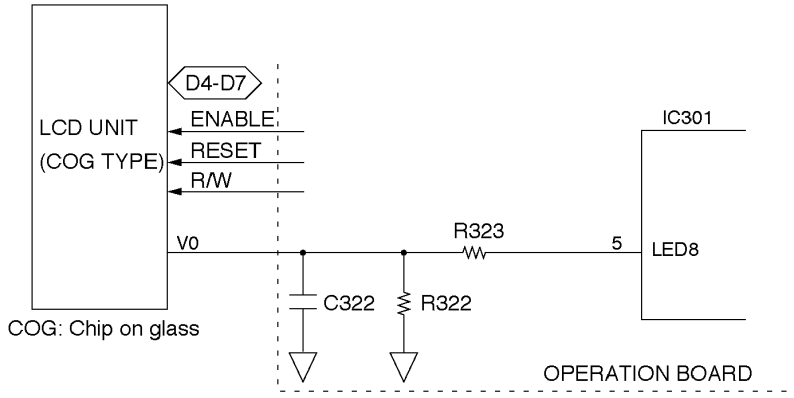
LED2	LED3	LED4
SW305 PLAY MESSAGES	LED302 AUTO ANSWER	LED301 SP-PHONE (MONITOR)

6.15. LCD SECTION

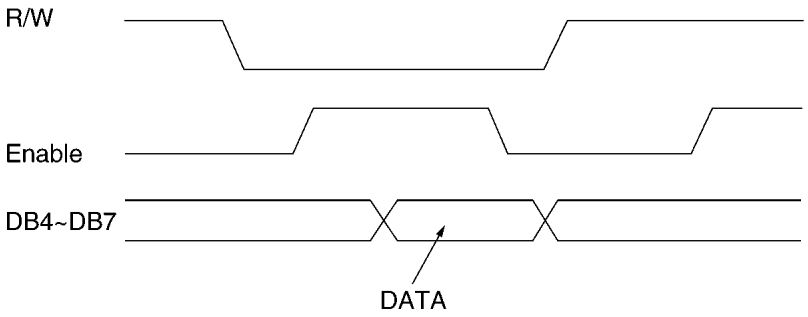
The Gate Array (IC301) works only for writing the ASCII code from the data bus (D4~D7). V0 is supplied for the crystal drive. R323 and R322 are density control resistors.

Consequently, in this unit, the timing (positive clock) is generated by the LCD interface circuitry in the gate array (IC301).

Circuit Diagram

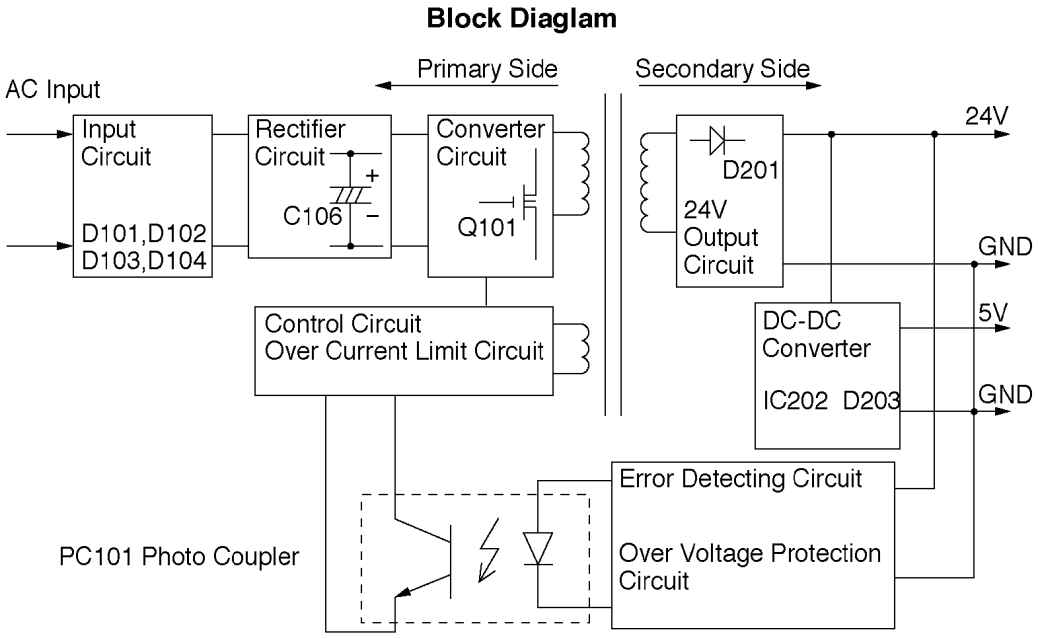


Timing Chart



Density	Normal	Dark
LED8 (IC301-5pin)	H	L

6.16. POWER SUPPLY BOARD SWITCHING SECTION



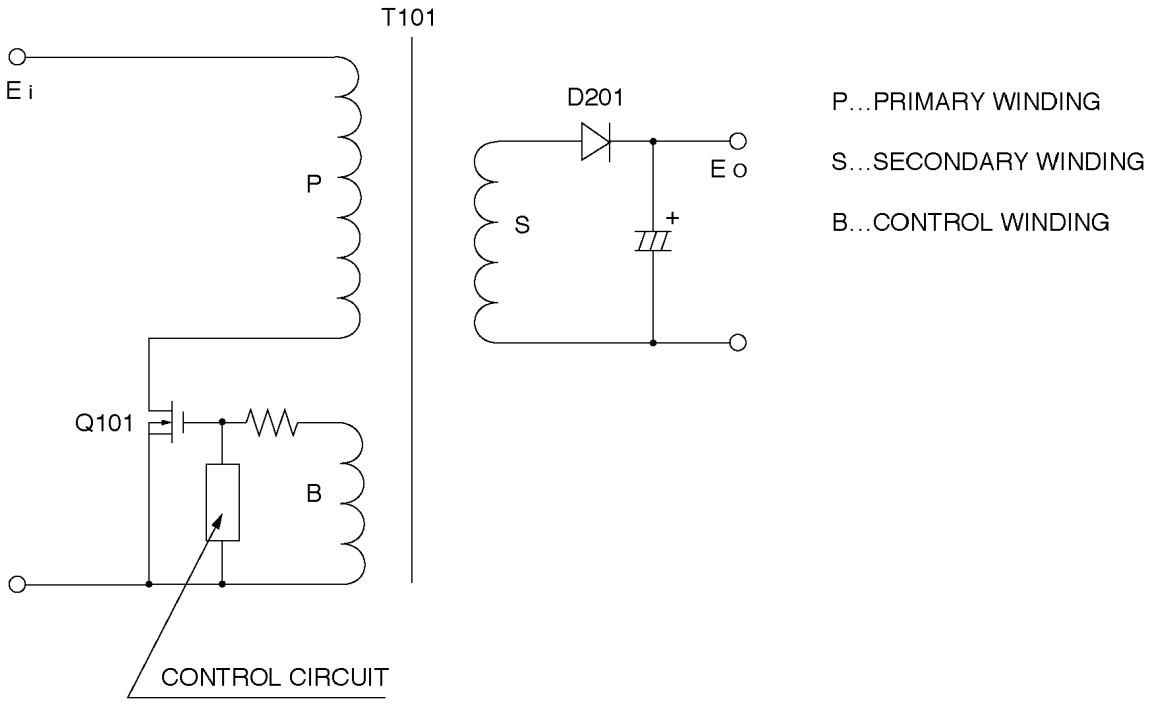
[Input Circuit]

Input current goes into the Input circuit and Rectifier circuit through the filter circuit. The filter circuit decreases noise terminal voltage and noise electric field strength.

[Rectifier Circuit]

Input current is rectified by D101, D102 D103, D104 and C106 to make DC voltage, then the power is supplied to the Converter circuit. Inrush current is limited by the thermistor, TH101.

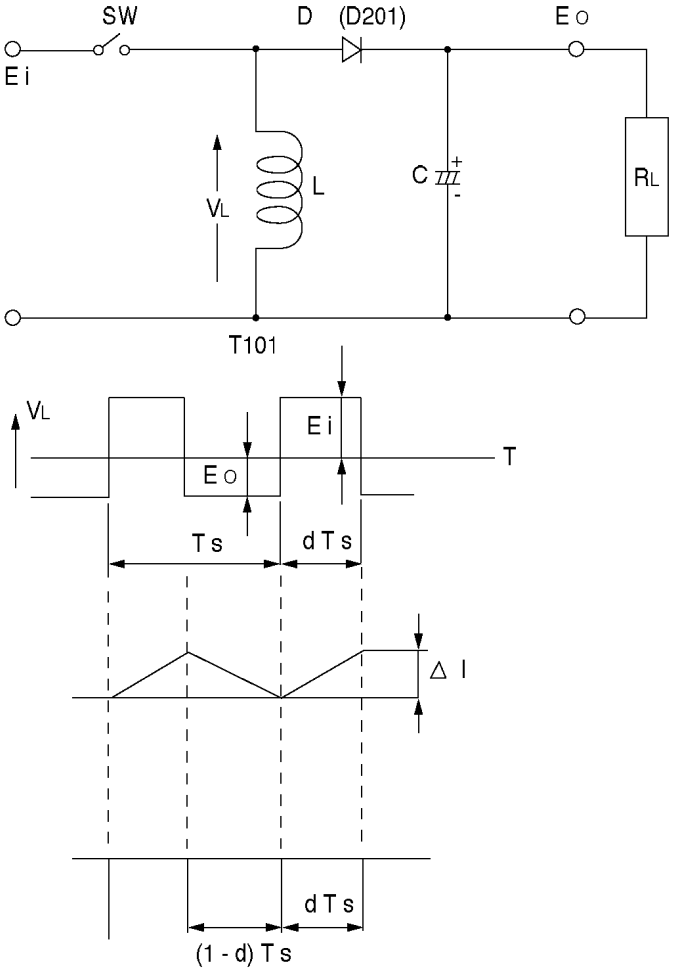
[Converter circuit]



The following shows the operation of this circuit with the simple circuit. The circuit in the previous page, when the transistor Q101 is ON, secondary rectifier diode D201 is OFF and the energy is charged in the transformer T101. Q101 continues being ON while the voltage is generated by control winding (B). Q101 is tuned OFF by control circuit, then each windings of T101 changes the polarity and rectifier diode D201 truns ON. The charged energy of T101 supplies power through D201 to output load. And the voltage of control winding is decreased and Q101 contines being OFF state. When all energy is discharged through D201, Q101 is turned ON again and it makes the polarity of each windings of T101 in reverse and goes to self oscillation. When input voltage Ei is high, the operation frequency is stopped up, and when load current is high, the operation frequency is stopped down.

Eo = d/(1-d)*Ei

d = Ton/Ts



T_{on}: ON TIME OF Q101

T_s : PERIOD OF OSCILLATION

In the equivalent circuit:

When SW is ON, current flows

SW → L

When SW is OFF, Current flows

L → R R_L

The value of inductance rectifiers increasing current during ON period.

$IL = Ei / L*d*Ts$ (1)

The value of inductance rectifiers decreasing current during OFF period.

$IL = Eo/L(1-d) * Ts$ (2)

From equations (1) and (2),

$Eo = d/(1-d) * Ei$

Because of the repetition of this operation, the voltage, which is stepped down by winding ratio of transformer, is produced at the secondary side of transformer. And after rectified, it´s supplied as a DC voltage.

[Control Circuit And Error Detecting Circuit]

Error detection circuit compares 24V output with the internal reference voltage, and transmits this error signal to control circuit of primary side through PC101. The control circuit drives the main transistor Q101 and controls the ON period according to the error signal in order to keep stability of output.This is shown as follows. When the output voltage of 24V circuit steps up, the current of photo coupler PC101 increases, the pulse width of gate signal of Q101 and the ON period of Q101 becomes shorter.

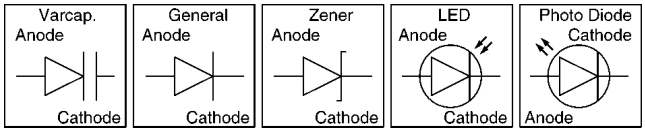
[Over Current Limiter (O.C.L.)]

IC101 rectifiers the highest voltage with resistors R105 detecting the current in the primary side. When the current is supplied higher then the highest voltage, it switches to latch mode which stops oscillating.

7 FOR THE SCHEMATIC DIAGRAMS

Note:

1. DC voltage measurements are taken with an oscilloscope or a tester with a ground.
2. The schematic diagrams and circuit board may be modified at any time with the development of new technology.
3.

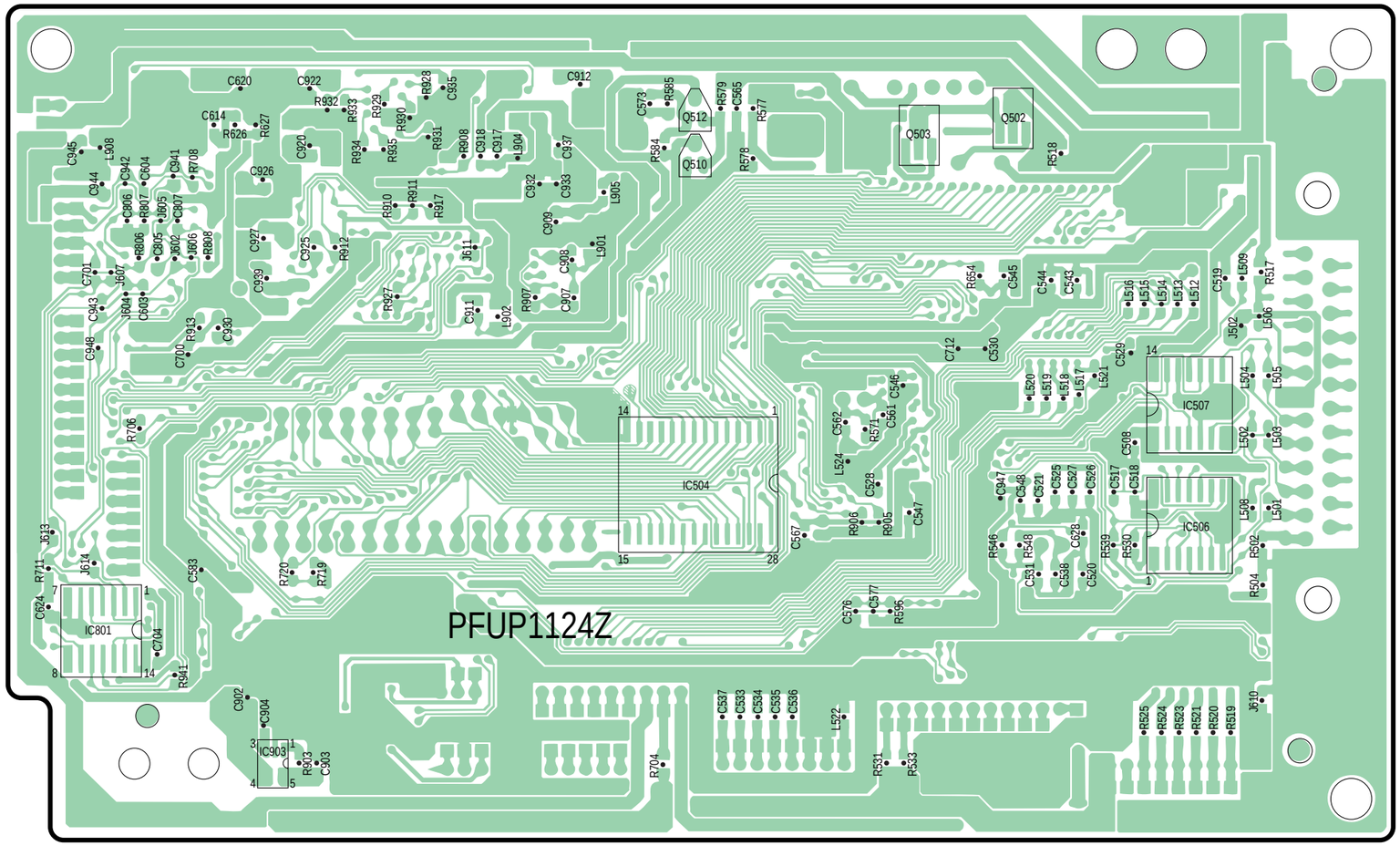


Important safety notice
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only the manufacturer's specified parts.

8 PRINTED CIRCUIT DIAGRAM

8.1. PRINTED CIRCUIT BOARD (DIGITAL BOARD : Bottom View)

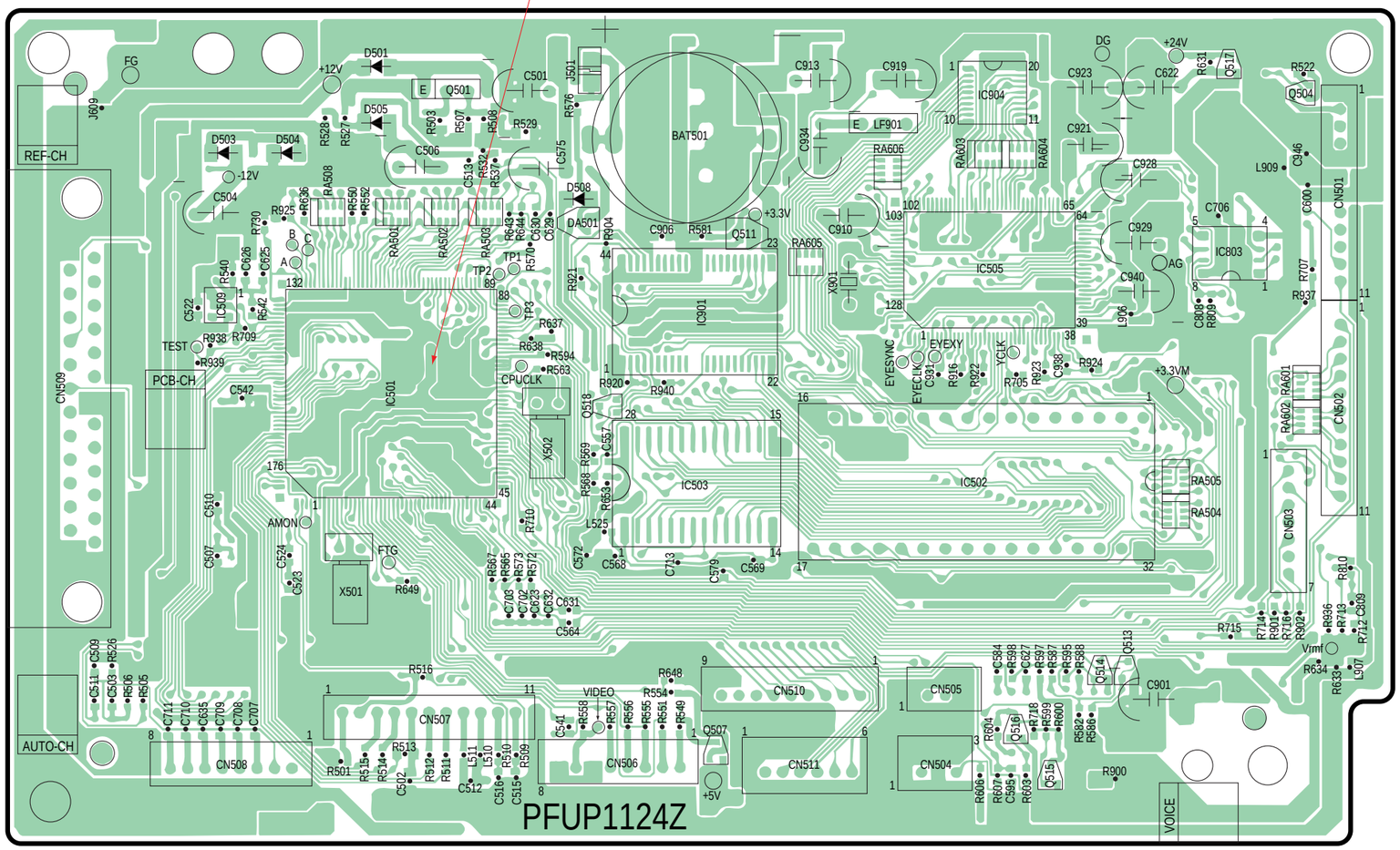
(Bottom View)



8.2. PRINTED CIRCUIT BOARD (DIGITAL BOARD : Component View)

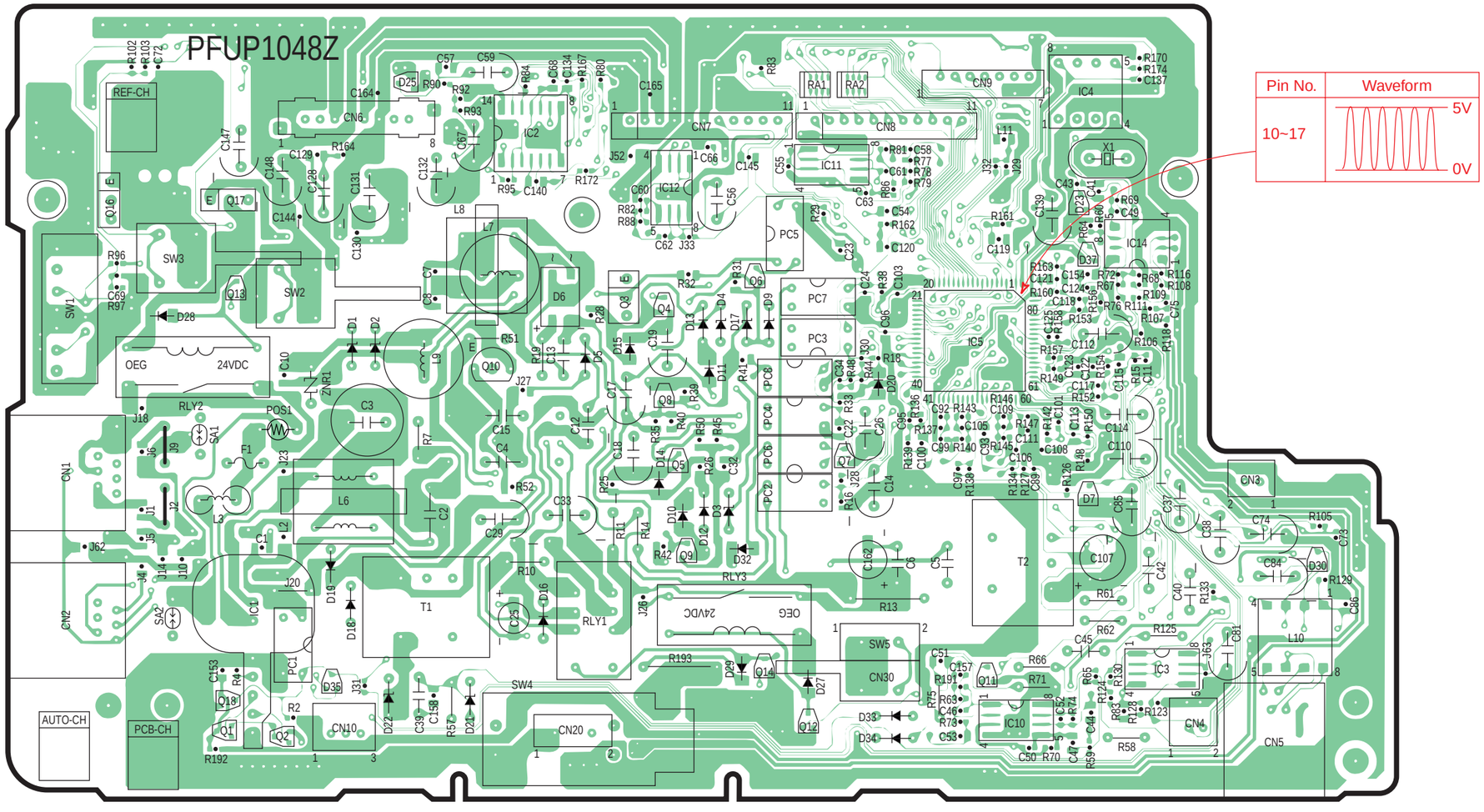
(Component View)

Pin No.	Waveform	Pin No.	Waveform
8, 9	32kHz	66, 67	24MHz



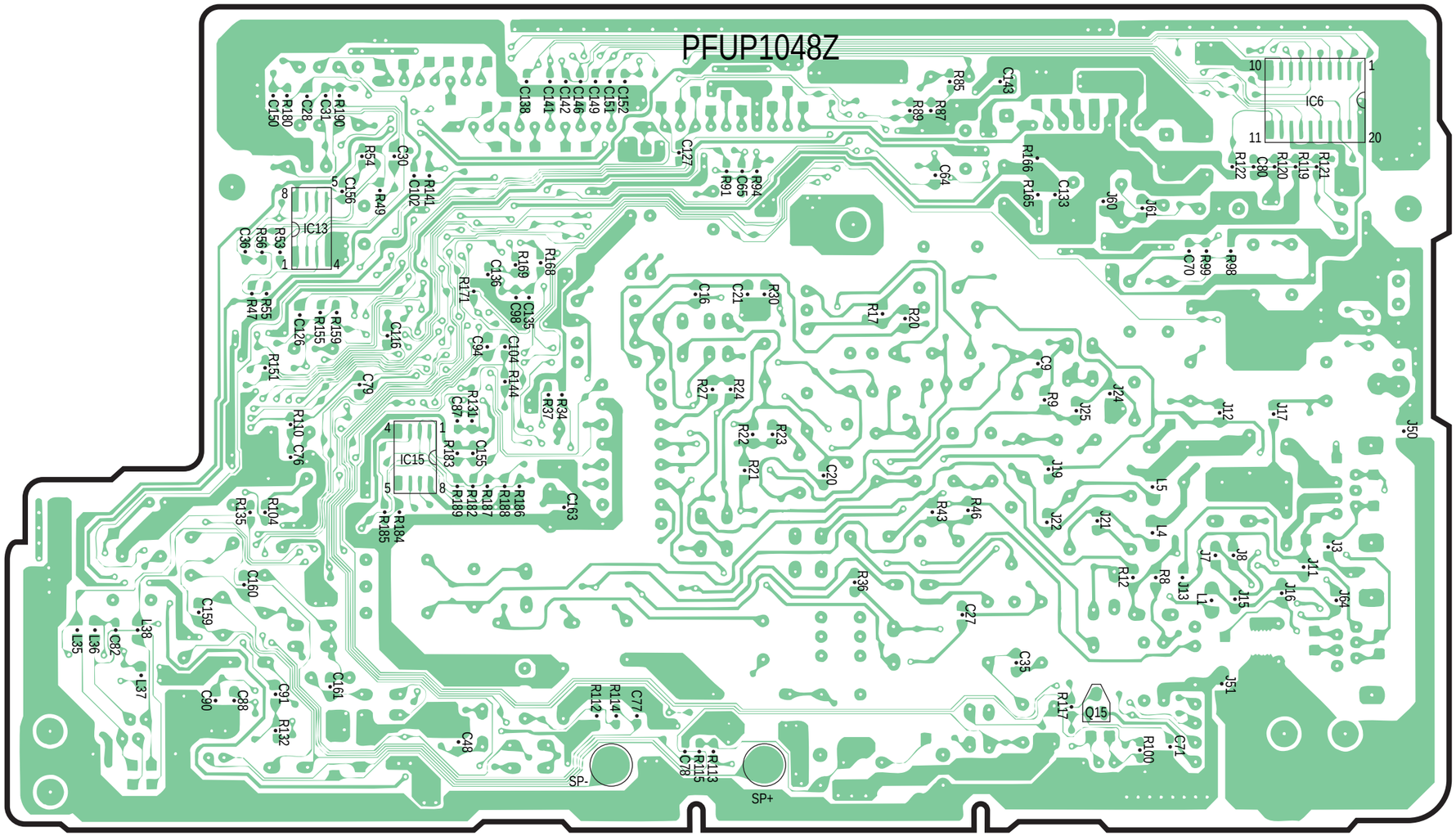
8.3. PRINTED CIRCUIT BOARD (ANALOG BOARD : Component View)

(Component View)



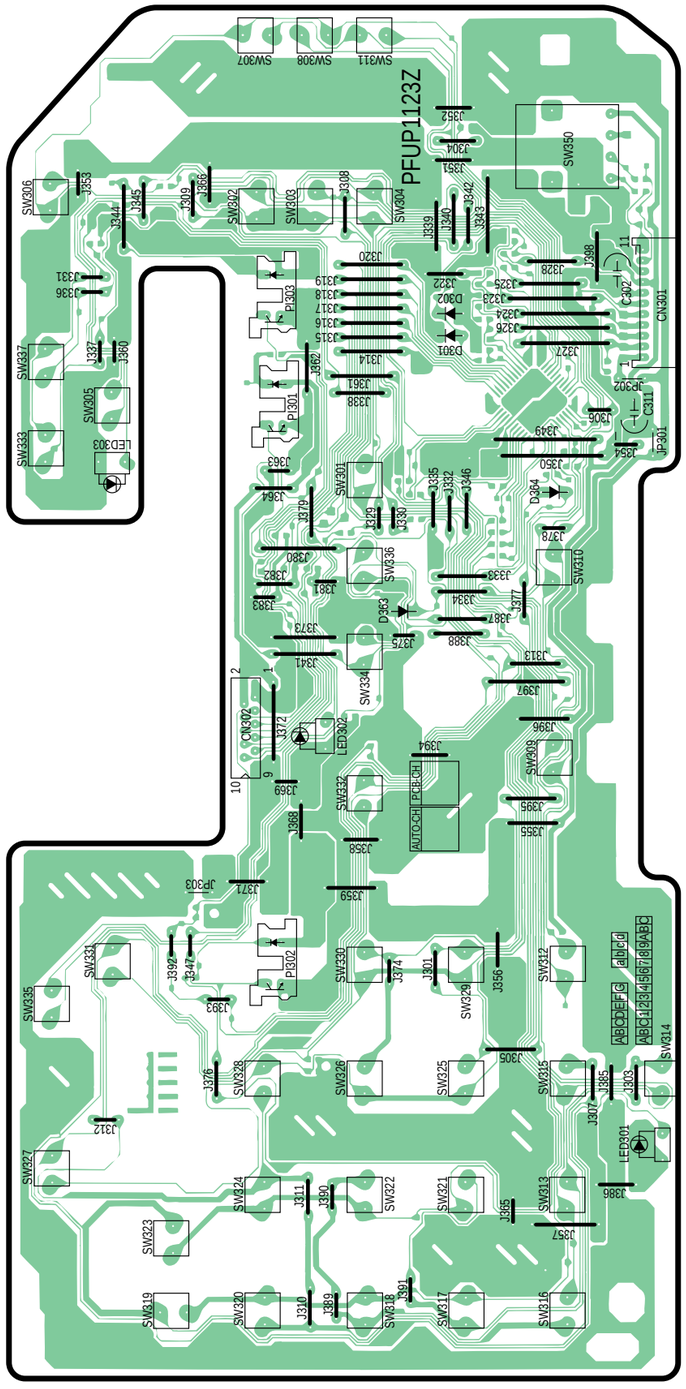
8.4. PRINTED CIRCUIT BOARD (ANALOG BOARD : Bottom View)

(Bottom View)

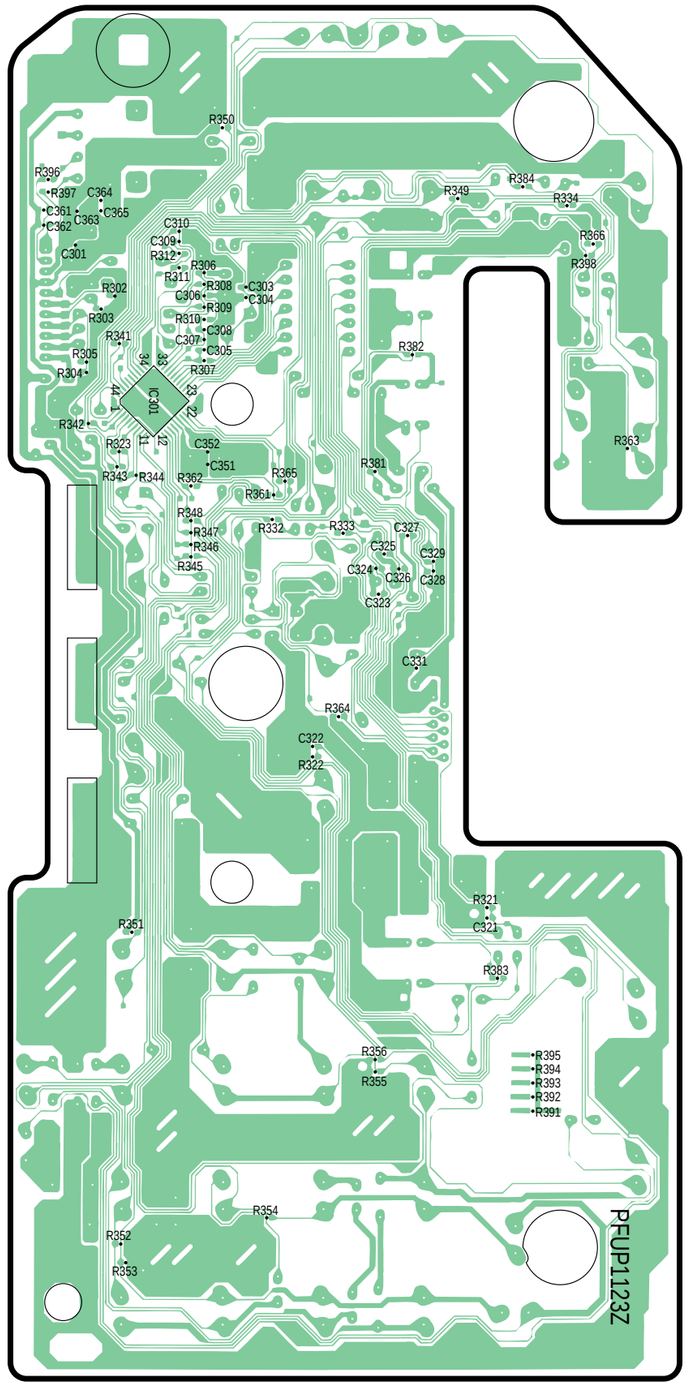


8.5. PRINTED CIRCUIT BOARD (OPERATION BOARD)

(Component View)

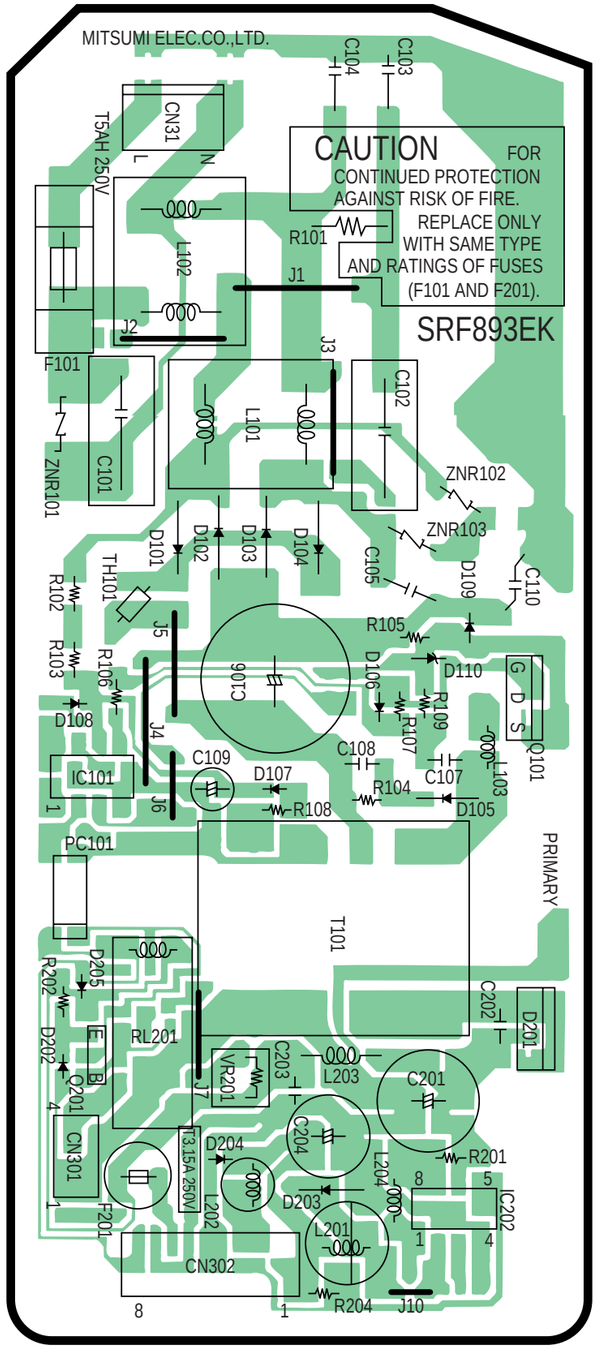


(Bottom View)

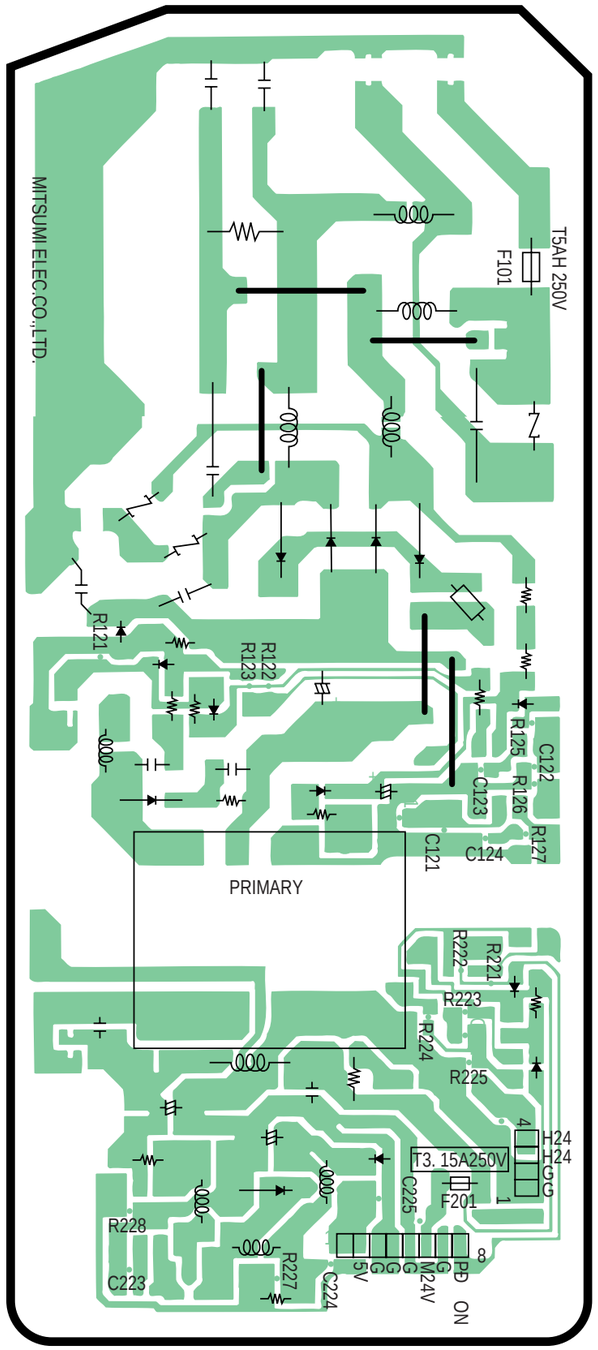


8.6. PRINTED CIRCUIT BOARD (SWITCHING POWER SUPPLY)

(Conponent View)

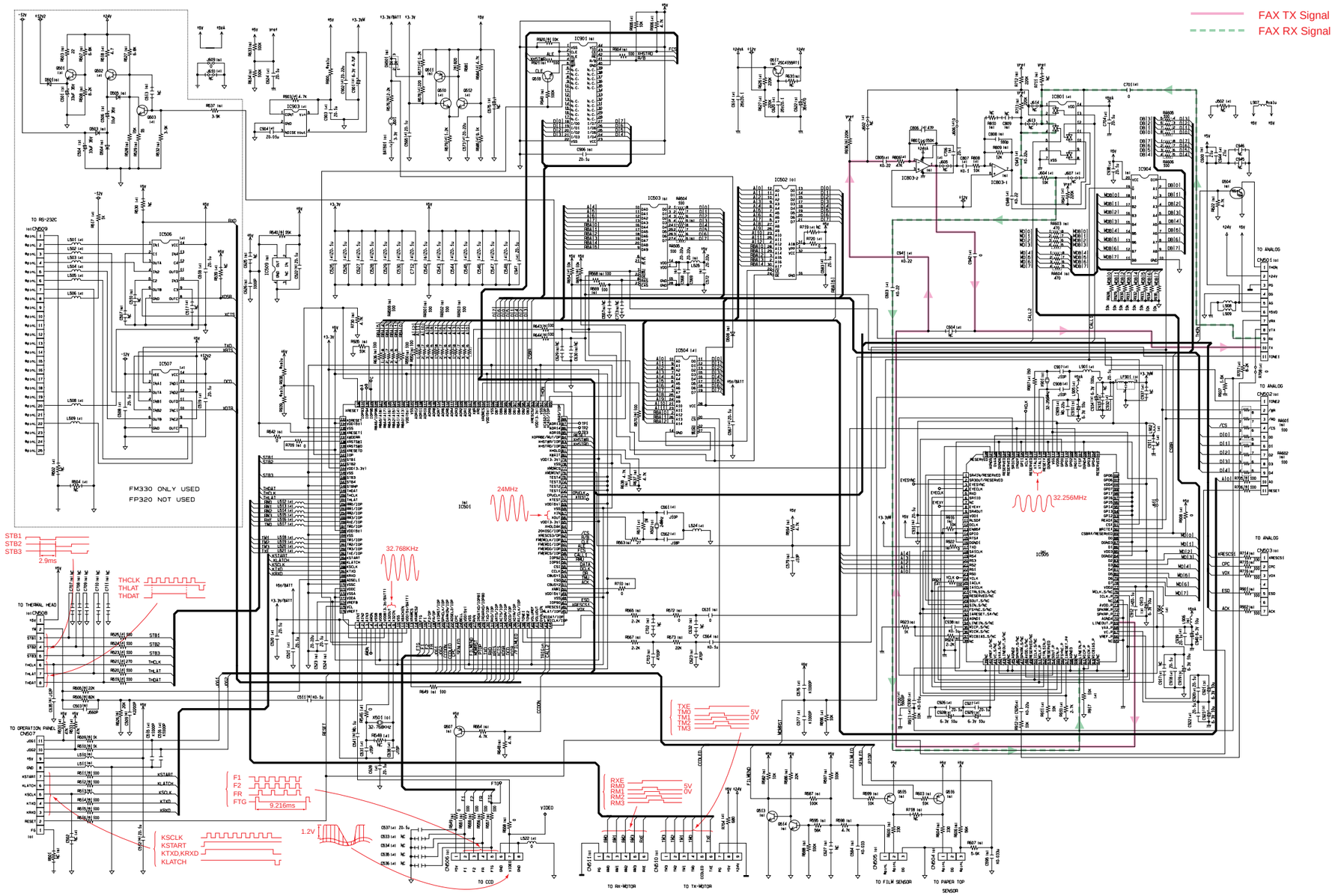


(Bottom View)

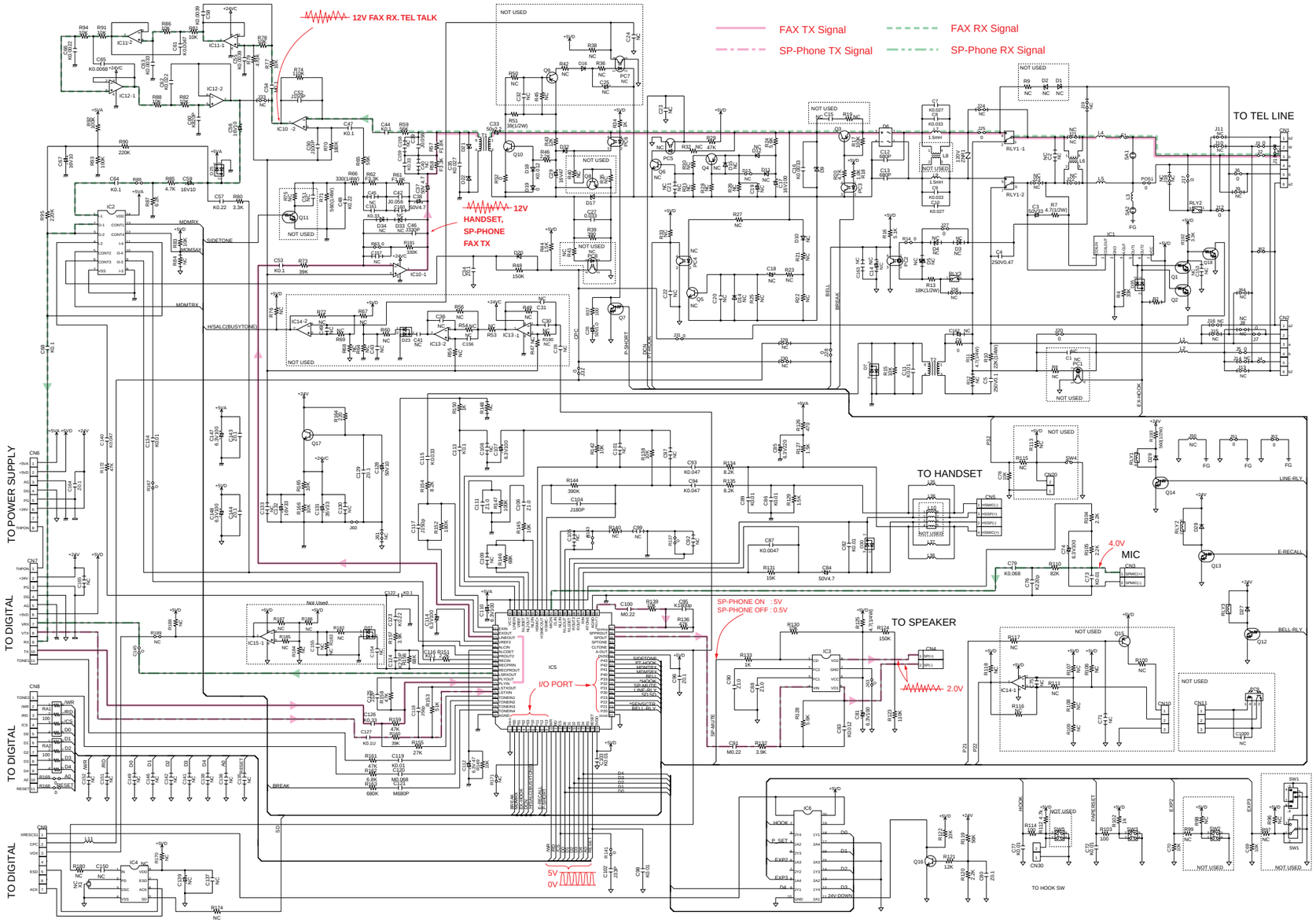


9 SCHEMATIC DIAGRAM (DIGITAL CIRCUIT)

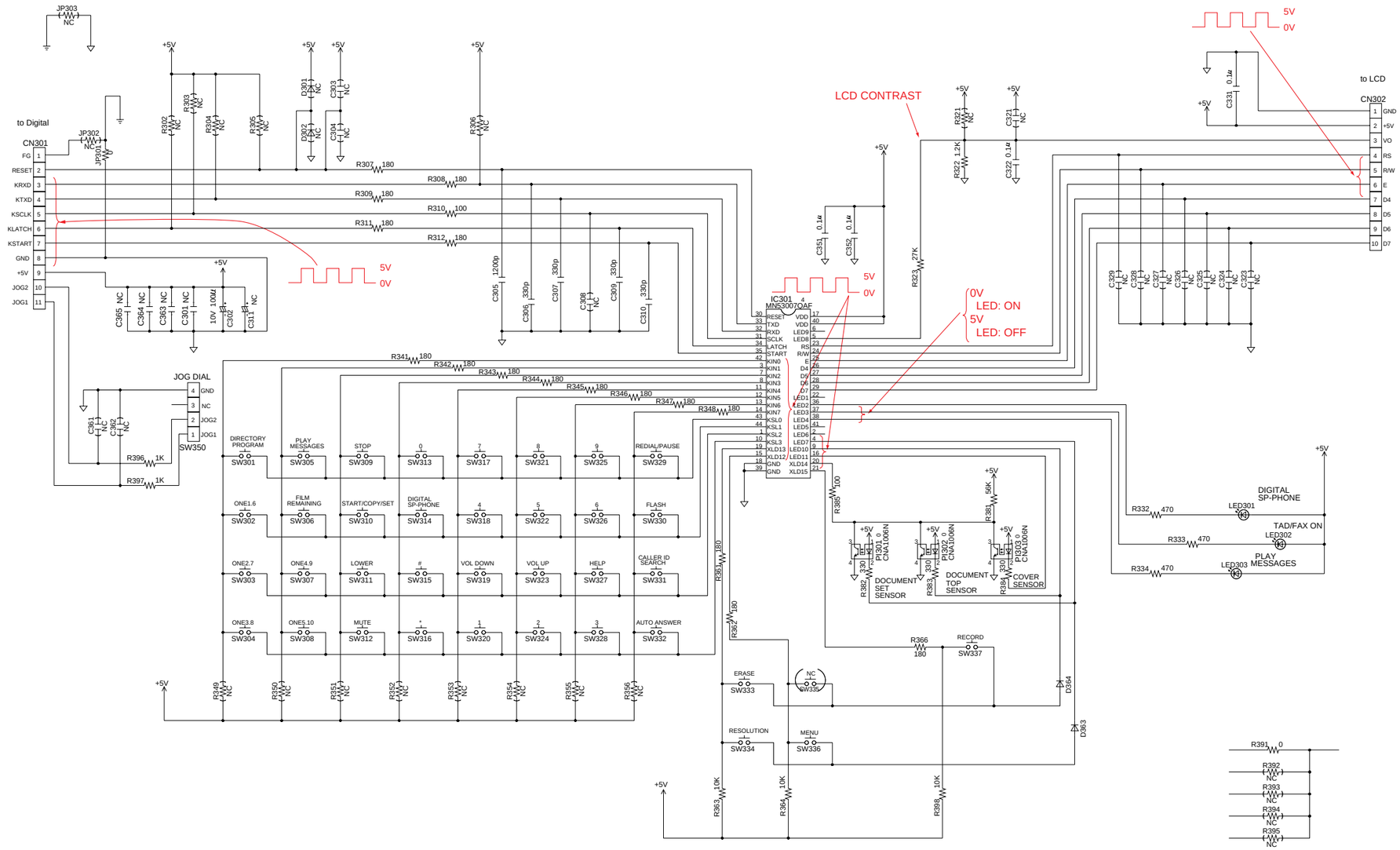
9.1. SCHEMATIC DIAGRAM (DIGITAL CIRCUIT)



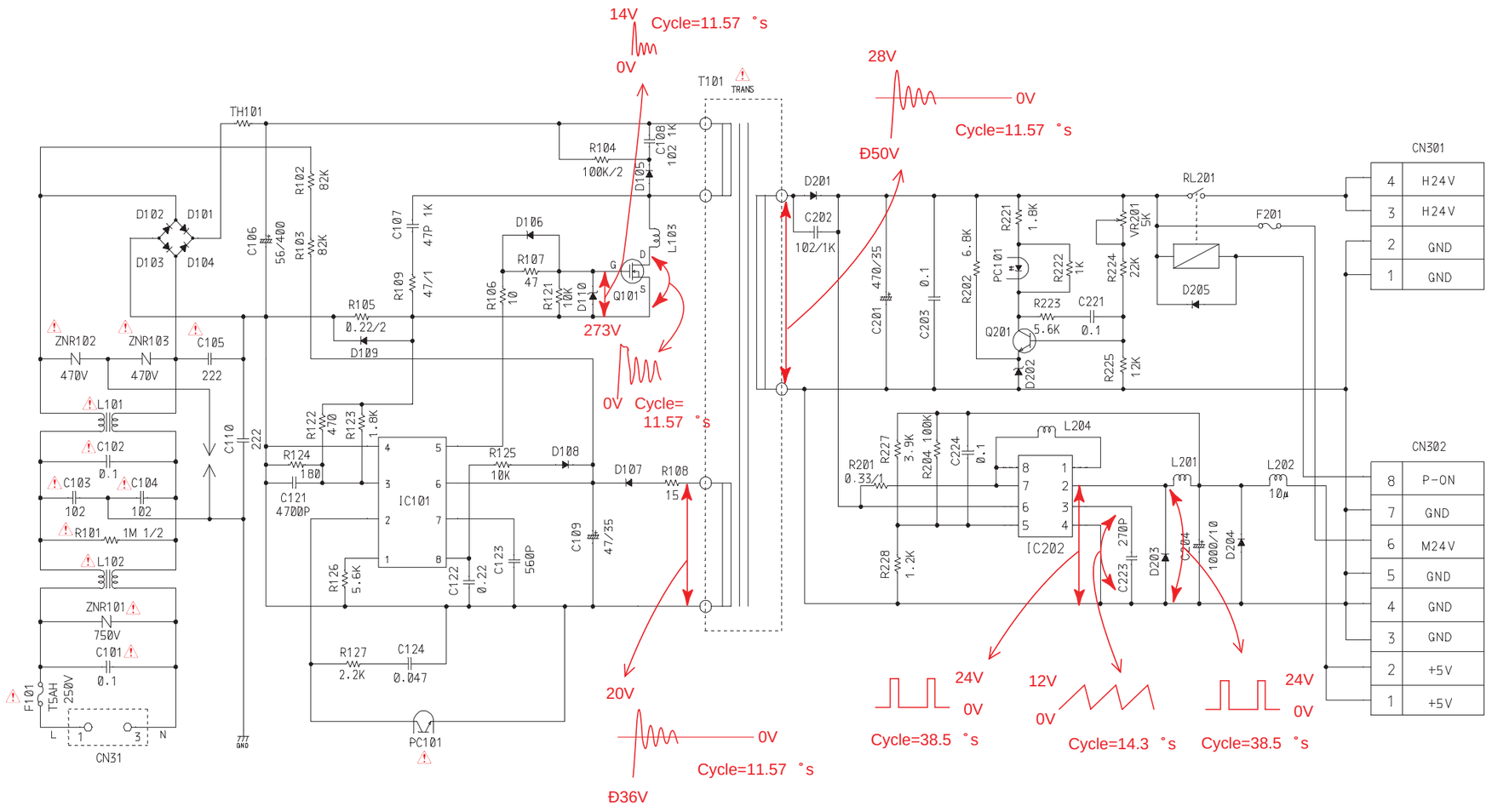
9.2. SCHEMATIC DIAGRAM (ANALOG CIRCUIT)



9.3. SCHEMATIC DIAGRAM (OPERATION CIRCUIT)

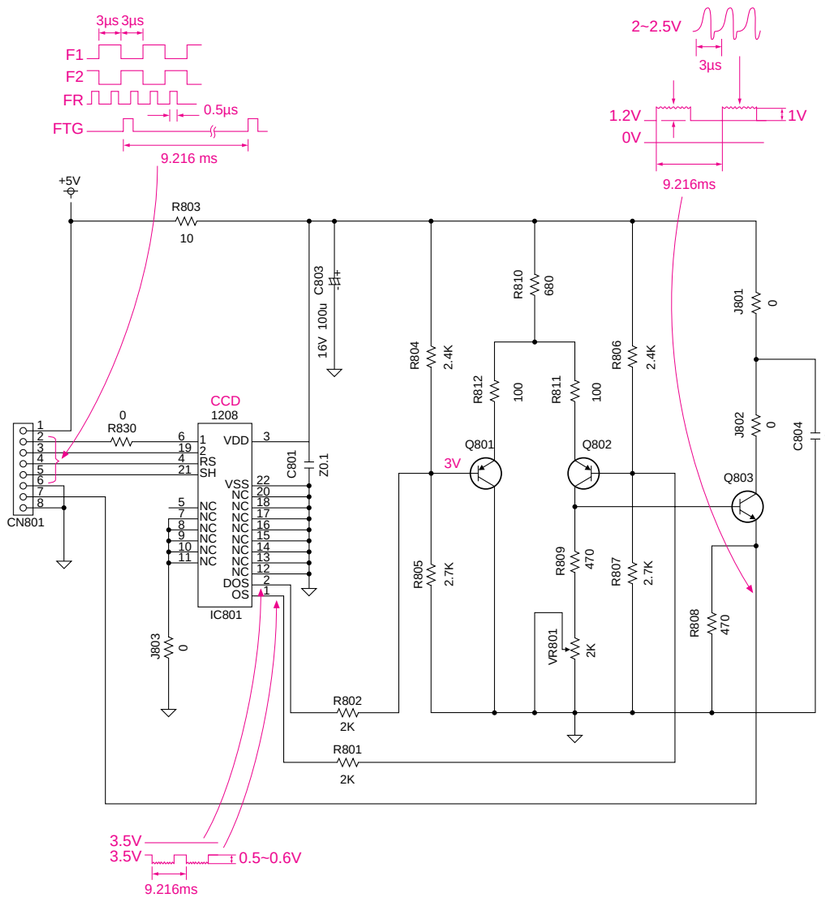


9.4. SCHEMATIC DIAGRAM (SWITCHING POWER SUPPLY)



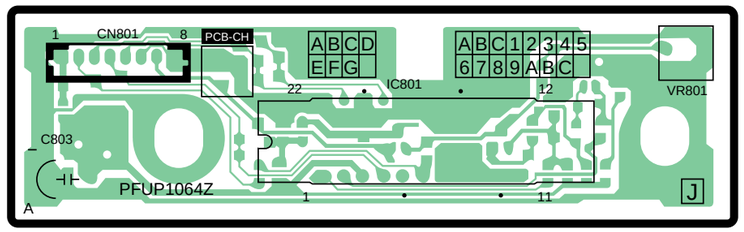
9.5. SCHEMATIC DIAGRAM AND PRINTED CIRCUIT BOARD (CCD)

CCD CIRCUIT

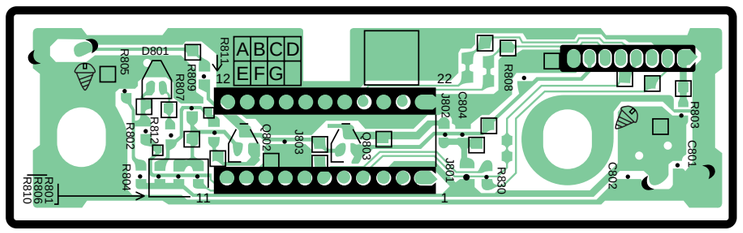


CCD BOARD

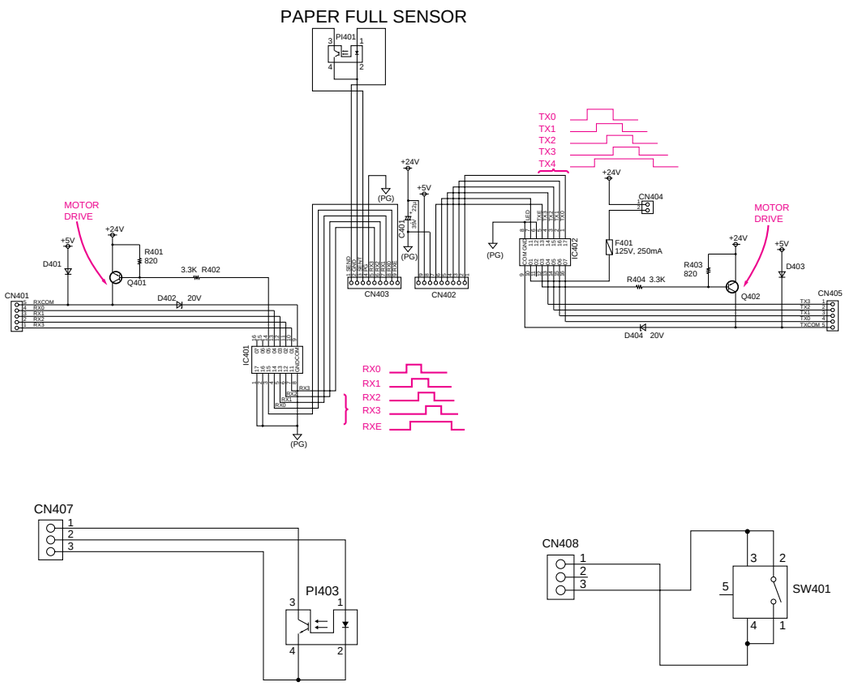
(Component View)



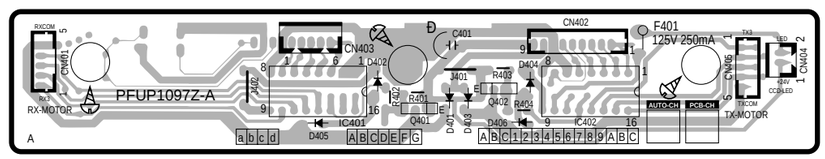
(Bottom View)

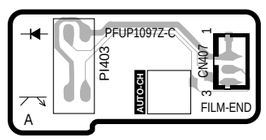


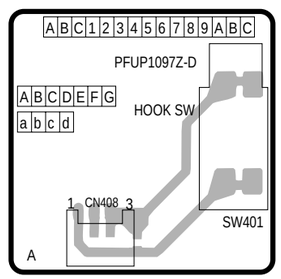
9.6. SCHEMATIC DIAGRAM/PRINTED CIRCUIT BOARD (SENSOR)

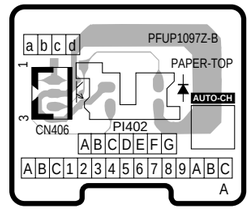


(Component View)

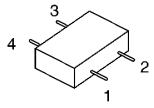
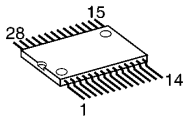
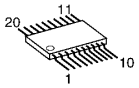
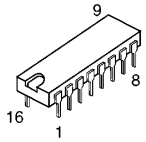
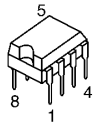
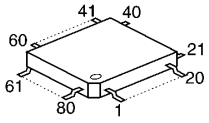
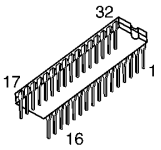
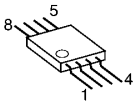
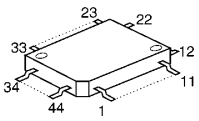
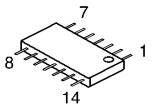
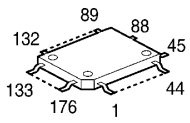
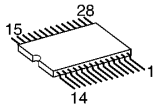
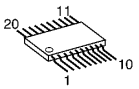
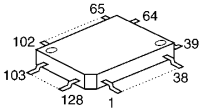
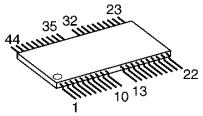
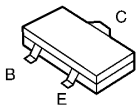
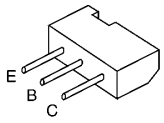
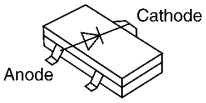
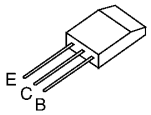
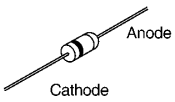
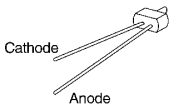
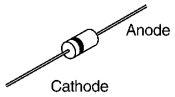
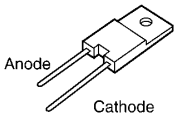
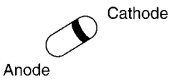
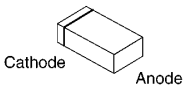
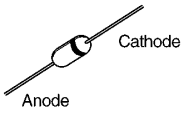
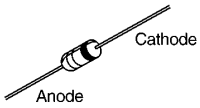
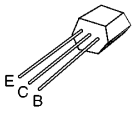
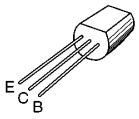




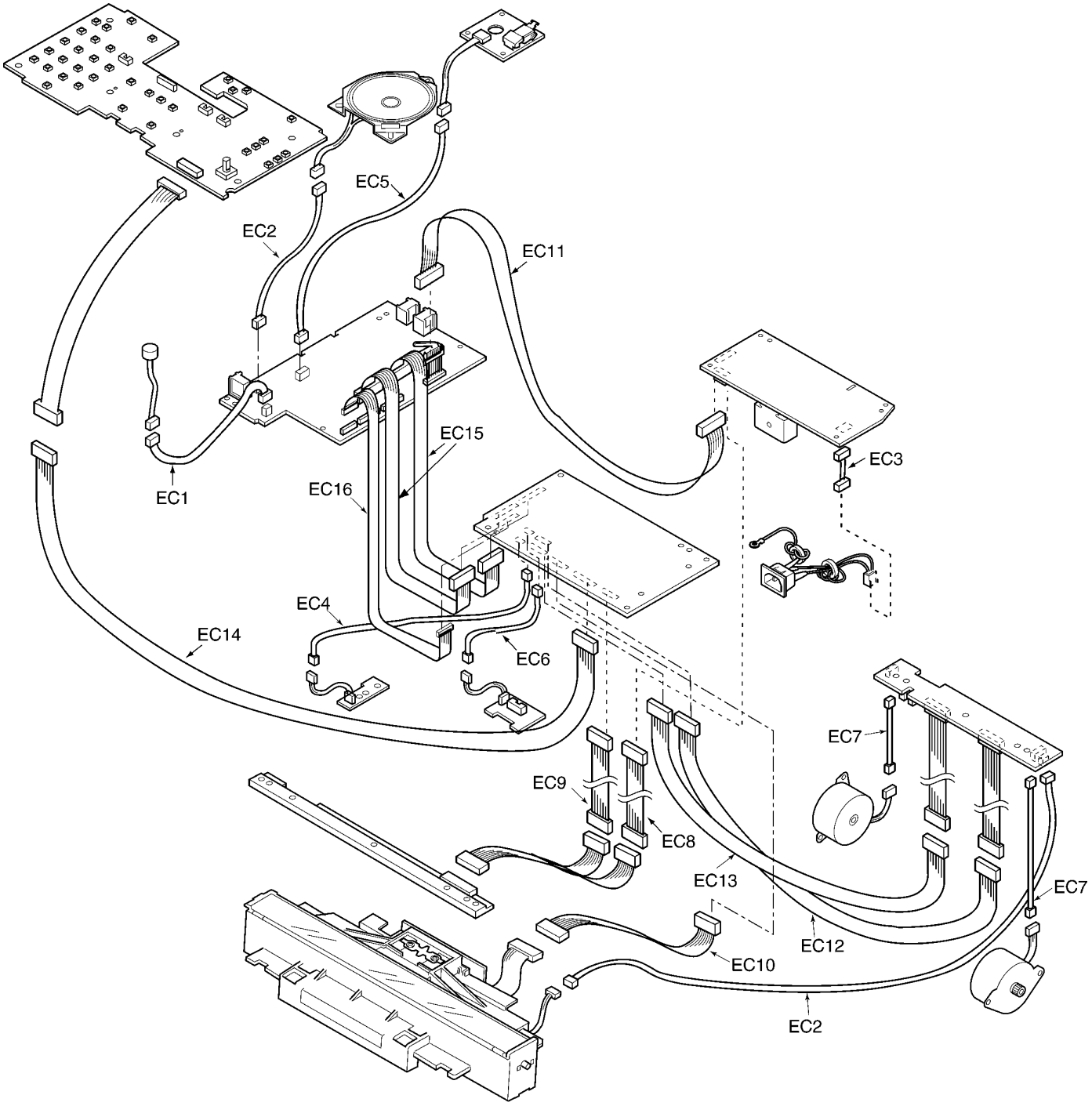




10 TERMINAL GUIDE OF THE IC´S TRANSISTORS AND DIODES

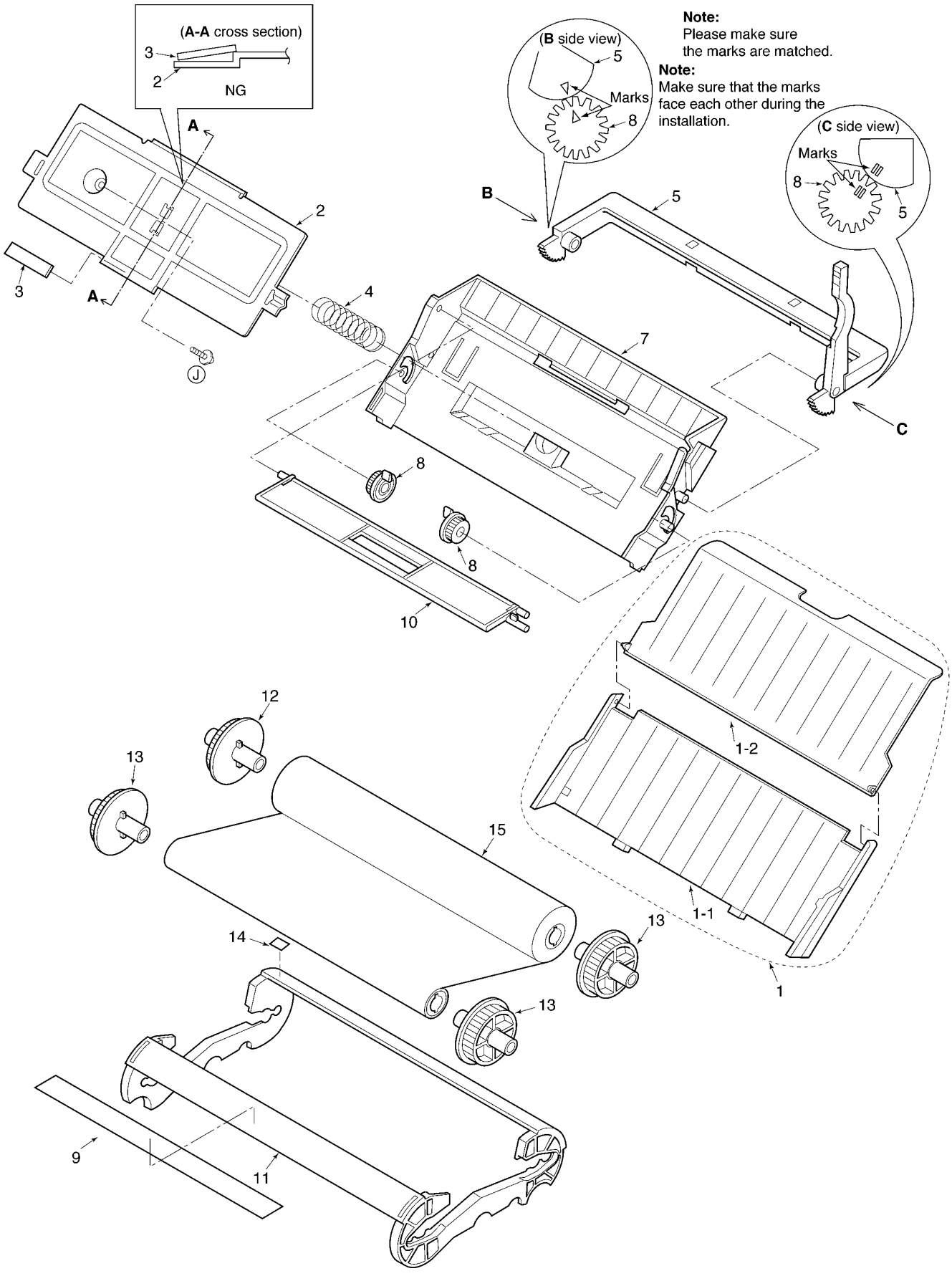
 PFVTDDGSZB60 PFVIS80842AN	 MN414800CSJ07	 PQVISN7H244S	 PQVIBA12003	 PFVIFA5317P
 AN6116FAQ	 PFWIFP320G1 PFWIFM330G1	 PQVINJM2113M PQVINJM4558M	 MN53007QAF	 PQVITC4066BF PFVIMC1489AM PFVIMC1488ML
 PFVIM66410G1	 PFVIGM6256FF	 PFVITVT245FT	 PFVIR675813	 PFVIKM29W4AT
 PQVTDTC143E PQVTDTC114EU 2SB1197K, 2SB1218A, 2SB709A, 2SC4155R 2SD1819A	 2SB1322, 2SD1921Q 2SD1994A	 MA141WK	 2SA1627	 PFVD1N4005 MA4180, MA4220 MA7200, 1SS147
 PQVDR325CA47	 PQVDERA81004 PQVDERA1802 PFVDEG01C PQVDERA1506 MA165	 PFVDSF5LC20U	 RLS71	 MA143
 1SS119	 MA4056, MA4075M	 PFVIMM1385EN 2SD874A	 2SC1740S	 2SC2235

11 FIXTURES AND TOOLS

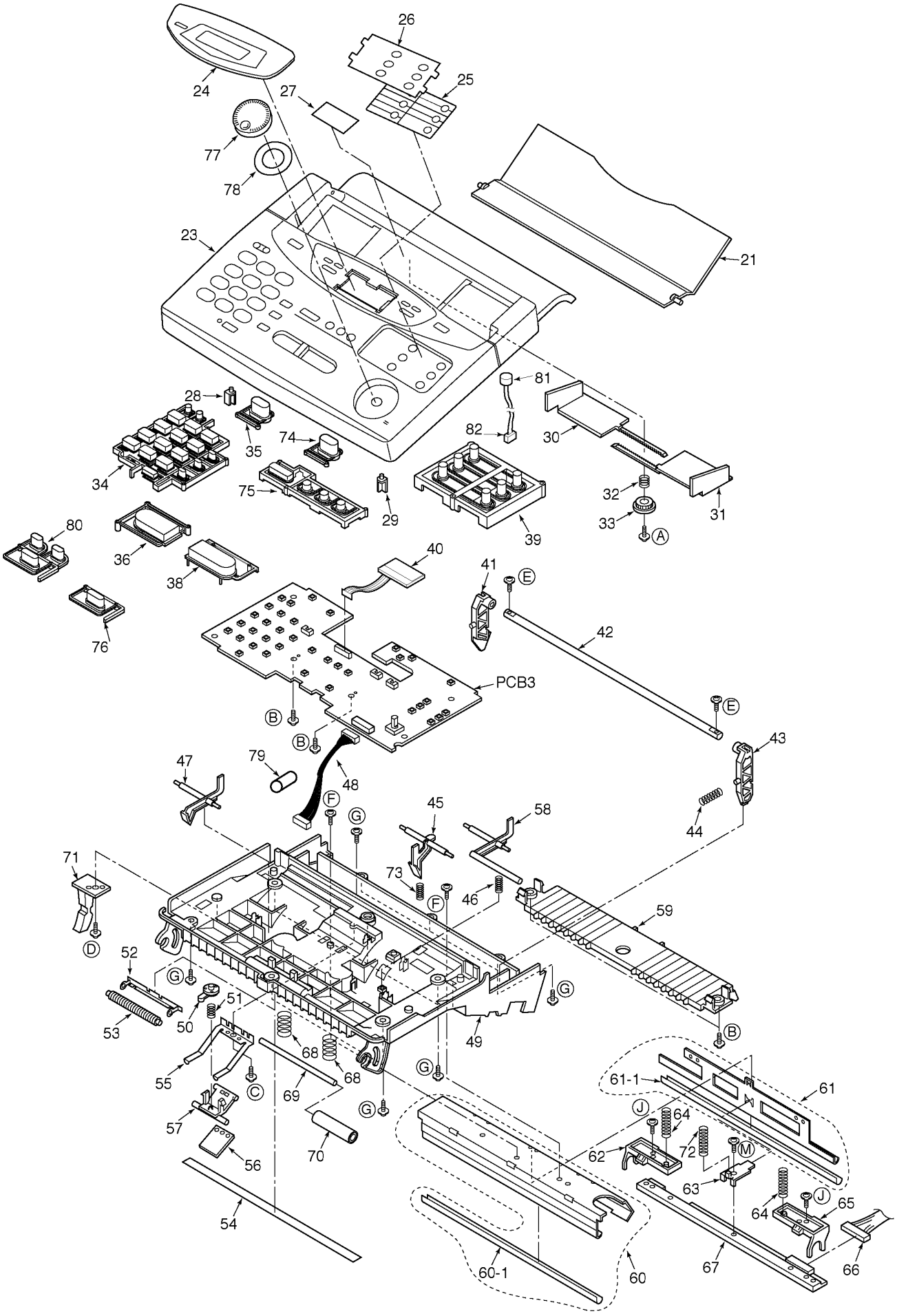


12 CABINET, MECHANICAL AND ELECTRICAL PARTS LOCATION

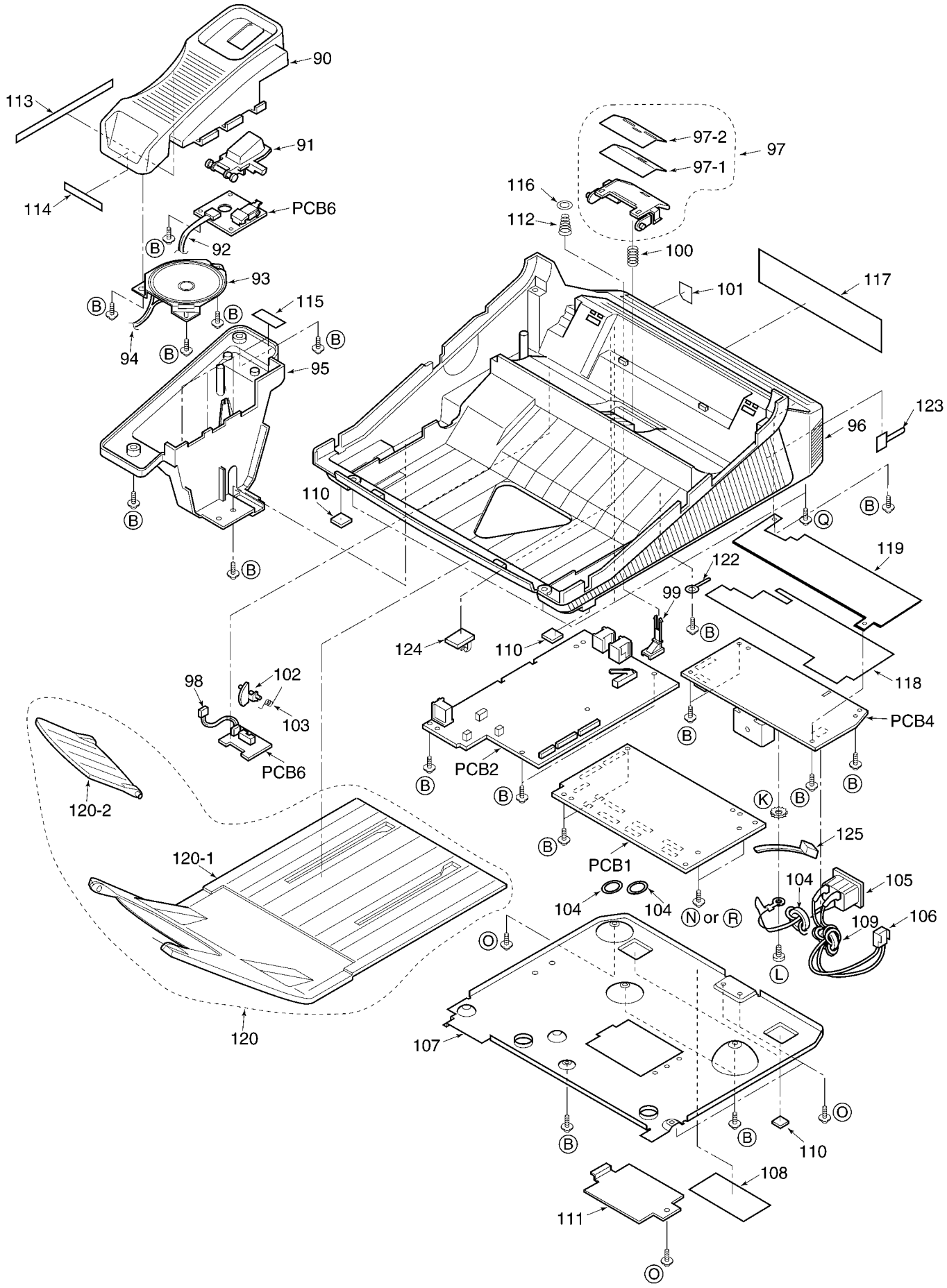
12.1. PAPER CASSETTE SECTION



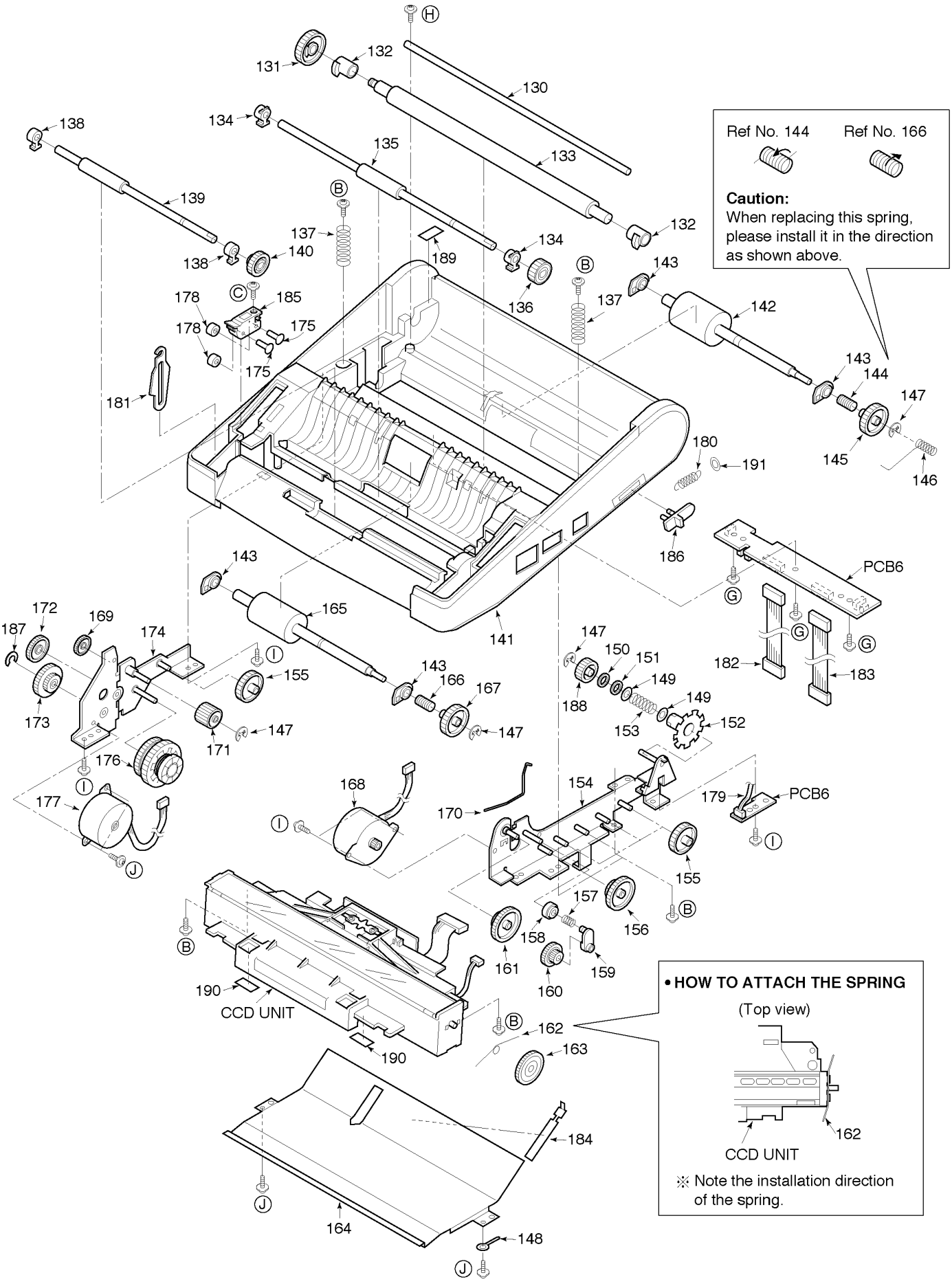
12.2. OPERATION PANEL SECTION



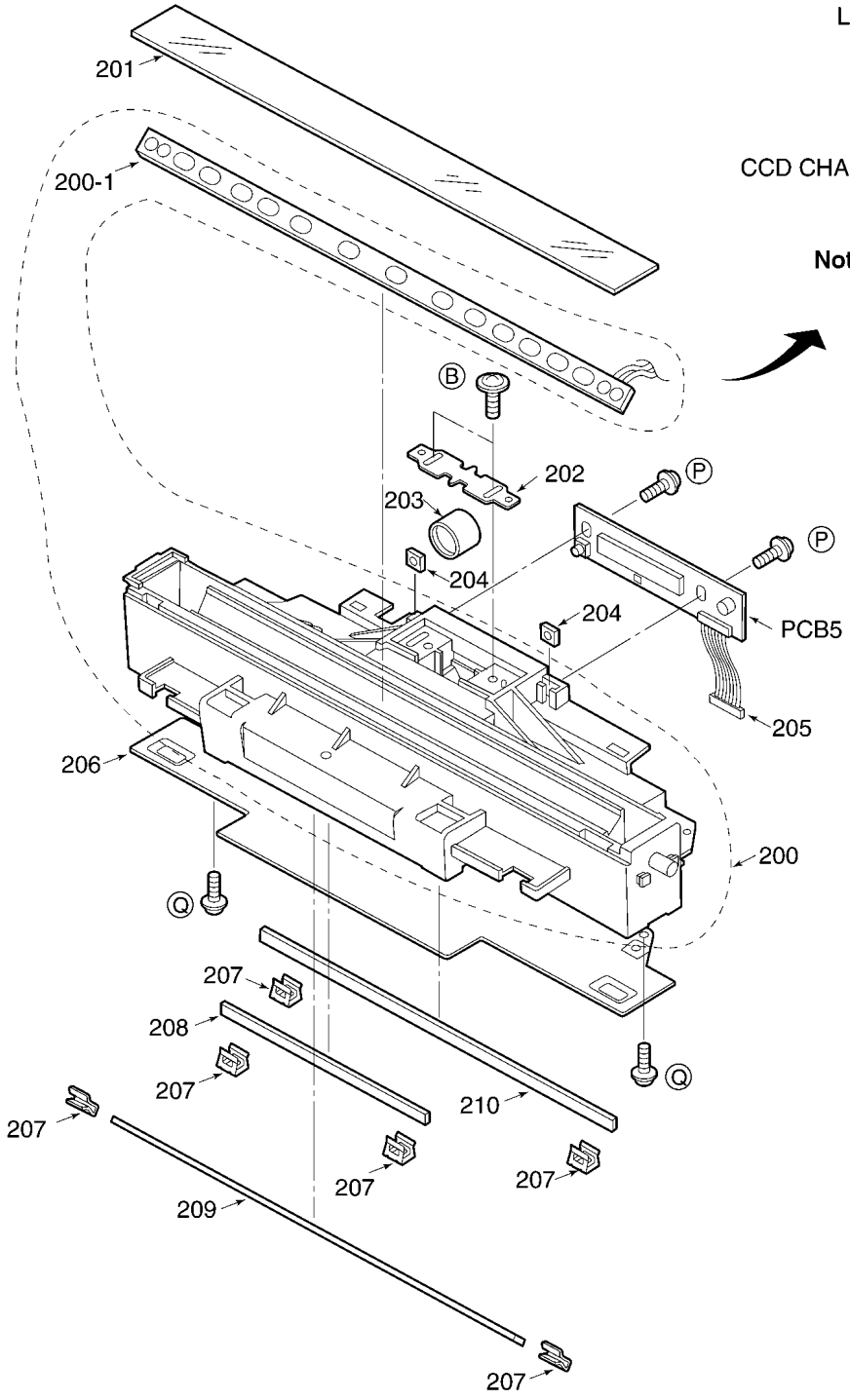
12.3. UPPER CABINET/P.C.B. SECTION

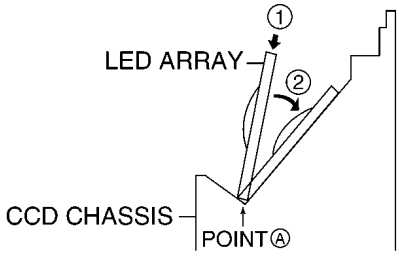


12.4. MECHANICAL SECTION



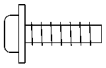
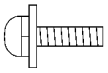
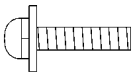
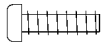
12.5. CCD UNIT SECTION



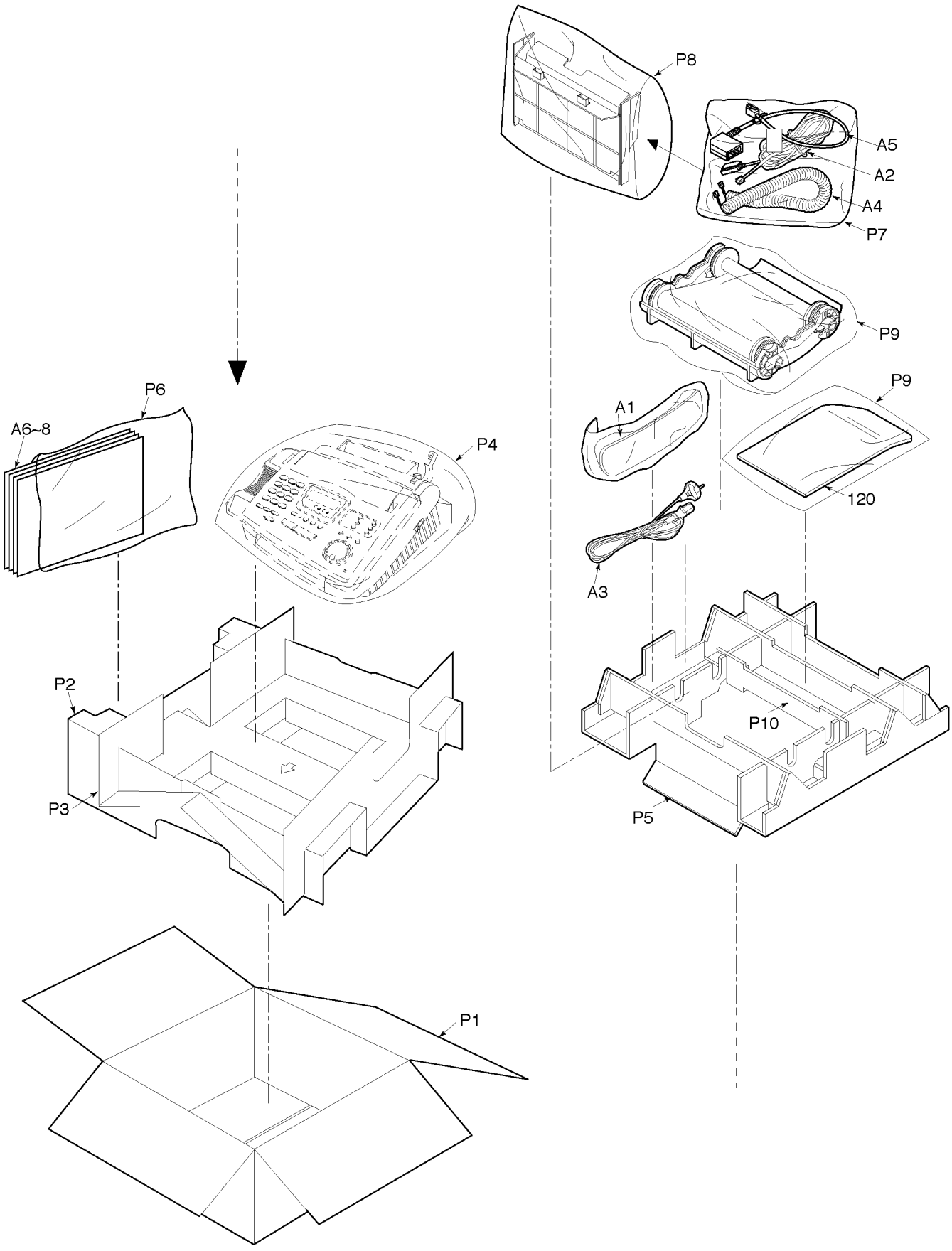


Note: Place the LED Array in the center of point Ⓐ as shown above.

12.6. ACTUAL SIZE OF SCREWS AND WASHER

Ref. No.	Part No.	Figure	Ref. No.	Part No.	Figure
Ⓐ	XTW3+W6P		Ⓙ	XTW3+U6L	
Ⓑ	XTW3+S10P		Ⓚ	XWC4B	
Ⓒ	XTW3+S6PR		Ⓛ	XSB4+6	
Ⓓ	XTW3+S8PFZ		Ⓜ	XTW3+5LR	
Ⓔ	XYN3+F8		Ⓝ	XTW3+U6LFZ	
Ⓕ	XTW3+U10L		Ⓞ	XTW3+U6LR	
Ⓖ	XTW3+S12P		Ⓟ	XYN3+F12	
Ⓗ	XTW3+W8P		Ⓠ	XTB3+10G	
Ⓘ	XTW3+6L		Ⓡ	XYC3+CF12FR	

13 ACCESSORIES AND PACKING MATERIALS



14 REPLACEMENT PARTS LIST

14.1. CABINET AND ELECTRICAL PARTS

Ref. No.	Part No.	Part Name & DescriptionCABINET AND ELECTRICAL PARTS	Remarks
		(12.1. PAPER CASSETTE SECTION)	
1	PFYEFP300G	PAPER TRAY	
1-1	PFYE2FP300G	SUB PAPER TRAY	
1-2	PFKS1013Z1	TRAY	
2	PFMD1026Z	"COVER	
3	PFHG1032Z	"RUBBER PARTSCASSETTE SEP."	
4	PFUS1087Z	SPRING	
5	PFDE1041Z3	"LEVER, CASSETTE LOCK"	S
6	Not Used		
7	PFKS1011W1	PAPER CASSETTE	S
8	PFDG1034Z	GEAR	
9	PFQT1258Y	INDICATION LABEL	
10	PFKK1004Z	SHUTTER	
11	PFHR1043Z1	RIBBON CASSETTE	
12	PFDG1038Z1	GEAR	
13	PFDG1037Z	GEAR	
14	PFQT1221Z	INDICATION LABEL	
15	PFPE1040Z	INK FILM (20m)	
		(12.2. OPERATION PANEL SECTION)	
20	Not Used		
21	PFKS1027Z1	"TRAY, DOCUMENT"	
22	Not Used		
23	PFGG1035Y1	OPERATION PANEL (KX-FP320G)	
23	PFGG1035X1	OPERATION PANEL (KX-FM330G)	
24	PFGP1129Y	PANEL (KX-FP320G)	
24	PFGP1129X	PANEL (KX-FM330G)	
25	PFGD1040Z	TEL. NO. CARD	
26	PFGV1006Z	TRANSPARENT PLATE	
27	PFQT1326Z	FACE DOWN LABEL	
28	PFGP1127Z	"COVER, LED"	
29	PFGP1091Z	"COVER, LED"	
30	PFKR1010Z2	DOCUMENT GUIDE-L	
31	PFKR1011Z2	DOCUMENT GUIDE-R	
32	PFUS1034Z	SPRING	
33	PFDG1002Z	GEAR	
34	PFBX1065Z1	"BUTTON, DIAL"	
35	PFBX1028Z1	"BUTTON, HELP"	
36	PFBC1029Z1	"BUTTON, STOP etc."	
37	Not Used		
38	PFBC1020Z1	"BUTTON, START"	
39	PFBX1067Z1	"BUTTON, ONE TOUCH"	
40	PFAVJS10401	LIQUID CRYSTAL DISPLAY	
41	PFDE1037Z	"LEVER, LOCK"	
42	PFDF1016Z	SHAFT	
43	PFDE1067Z	"LEVER, LOCK"	
44	PFUS1080Z	SPRING	
45	PFDE1019Z	"LEVER, DOCUMENT DETECTION"	
46	PFUS1027Z	SPRING	
47	PFDE1020Y	"LEVER, READ DETECTION"	
48	PFJS11Q06Z	"CONNECTOR, 10P"	
49	PFUV1021Z	"COVER, OPERATION PANEL"	
50	PFHR1019Z	"LEVER, ADJUST"	
51	PFUS1121Z	SPRING	
52	PFUS1026Y	"SPRING, SUPPORT ROLLER"	
53	PQDR10005Y	ROLLER	
54	PFHX1081Z	"SHEET, READING"	
55	PFUS1082Z	SPRING	
56	PFHR1081Z	GUIDE, SEPARATION RUBBER	
57	PFHG1020Z	SEPARATION RUBBER	
58	PFDE1043Y	"LEVER, SENSOR"	
59	PFKF1009Z1	"SUB CABINET, OPERATION"	
60	PFZU1FP200M	HEAD FRAME ASS´Y	
60-1	PFHX1115Z	SHEET, RIBBON GUIDE	
61	PFZU2FP200M	ANGLE ASS´Y	
61-1	PFHX1115Z	"SHEET, RIBBON GUIDE"	
62	PFDE1034X	GUIDE-L	
63	PFMH1038Z	ANGLE	
64	PFUS1083Z	SPRING	
65	PFDE1035X	GUIDE-R	
66	PFJS12Q41Z	"CONNECTOR, 15P"	
67	PFJHS013Z	THERMAL HEAD	
68	PFUS1025Z	SPRING	
69	PFDF1005Z	SHAFT	
70	PQDR9685Y	"ROLLER, SUPPORT"	
71	PFHR1047Y	ARM-L	
72	PFUS1088Z	SPRING	
73	PFUS1109Z	SPRING	
74	PFBC1036Z1	"BUTTON, FILM REMAINING "	
75	PFBX1066Z1	"BUTTON, AUTO ANSWER"	
76	PFBX1068Y1	"BUTTON, ERASE/RECORD"	
77	PFBE1002Z4	JOG DIAL	
78	PFHX1199Z	JOG SHEET	
79	PQLB5C3	FERRITE CORE	
80	PFBX1068Z1	"BUTTON, ERASE/RECORD"	
81	PQJM128Z	MICROPHONE	
82	PFJS02Q09Z	CONNECTOR, 2PIN	
		(12.3. UPPER CABINET/P.C.B. SECTION)	
90	PFKM1014Y1	"HANDSET CRADLE, UPPER"	
91	PFBH1004Y1	"BUTTON, HOOK"	
92	PFJS03R49Y	"CONNECTOR, 3P"	
93	PQAS5P13Y	SPEAKER	
94	PFJS02R54Z	"CONNECTOR, 2P"	
95	PFKM1015Z1	"HANDSET CRADLE, LOWER"	
96	PFKF1015C1	UPPER CABINET (KX-FP320G)	
96	PFKF1015B1	UPPER CABINET (KX-FM330G)	
97	PFZEFP250M	"GUIDE, SEPARATION RUBBER"	
97-1	PFHG1045Z	"RUBBER PARTS	
97-2	PFHX1114Z	SEPARATION SHEET	
98	PFJS03R52Z	"CONNECTOR, 3P"	
99	PFDE1042Z	"LEVER, SENSOR"	
100	PFUS1068Z	SPRING	
101	PQHX10155Z	COVER	
102	PQDE10055Z	"LEVER, SENSOR"	
103	PFUS1076Z	SPRING	
104	PQLB1E1	FERRITE CORE	
105	PFJP03S04Z	AC INLET	⚠
106	PFJS02R19Y	"CONNECTOR, 2P"	
107	PFMD1030Z	COVER	
108	PFGT1477Z-M	NAME PLATE (KX-FP320G)	⚠
108	PFGT1478Z-M	NAME PLATE (KX-FM330G)	⚠
109	KR06TT251508	FERRITE CORE	
110	PFHG1050Z	FOOT	
111	PQHM171Z	ROM LID	

Ref. No.	Part No.	Part Name & DescriptionCABINET AND ELECTRICAL PARTS	Remarks
112	PFUS1086Z	SPRING	
113	PFHX1170Z	VIBRATION SHEET	
114	PFHX1148Z	VIBRATION SHEET	
115	PFHX1171Z	VIBRATION SHEET	
116	PFNW1002Z	WASHER	
117	PFQT1254Z	CAUTION LABEL	
118	PFHX1165Z	POWER ENCLOSURE SHEET	
119	PFMD1023Z	POWER SHEELD	
120	PFZE1FP300G	PAPER STACKER ASS´Y	
120-1	PFKS1020Z1	PAPER STACKER	
120-2	PFKS1021Y1	SUB PAPER STACKER	
121	Not Used		
122	PQHM112Z	CLAMPER	
123	PQHR136Z	CLAMPER	
124	PQHR10215Z	CLAMPER	
125	PQHR945Z	LEAD BINDER	
		(12.4. MECHANICAL SECTION)	
130	PFDF1018Z	"SHAFT, RIBON GUIDE”	
131	PFDG1027Y	"GEAR, PLATEN DRIVE"	
132	PFDJ1011Z	"SPACER, PLATEN"	
133	PFDN1010Z	"ROLLER, PLATEN”	
134	PFDJ1007Z	"SPACER, ROLLER"	
135	PFDN1006Z	"ROLLER, DOCUMENT FEED"	
136	PFDG1004Z	"GEAR, DOCUMENT FEED”	
137	PFUS1073Z	"SPRING, POP UP"	
138	PFDJ1006Z	"SPACER, ROLLER"	
139	PFDN1005Z	"ROLLER, DOCUMENT FEED"	
140	PFDG1003Z	"GEAR, DOCUMENT FEED ROLLER”	
141	PFKM1020T1	"CABINET, MAIN"	
142	PFDN1011Z	"ROLLER, PICK UP"	
143	PQDJ10002Z	"SPACER, ROLLER"	
144	PFUS1067Z	"SPRING, CLUTCH"	
145	PFDG1074Z	"GEAR, PICK UP ROLLER"	
146	PFUS1122Y	“SPRING, EARTH”	
147	XUC2FY	RETAINING RING	
148	PQHM112Z	CLAMPER	
149	PFNW1003Z	WASHER	
150	PFHG1030Z	RUBBER PARTS	
151	XWE5VW	WASHER	
152	PFDG1036Z	"GEAR, ENCORDER"	
153	PFUS1065Z	“SPRING, BACK TENSION"	
154	PFUA1009Y	"CHASSIS, TX GEAR"	
155	PFDG1032Y	"GEAR, IDLER"	
156	PFDG1033Y	"GEAR, IDLER"	
157	PFUS1019Z	“SPRING, THRUST”	
158	PFDG1005Z	“GEAR, CHANGEOVER”	
159	PFDE1014Z	"ARM, CHANGEOVER”	
160	PFDG1009Z	"GEAR, IDLER"	
161	PFDG1008Z	"GEAR, IDLER"	
162	PFUS1017Y	"SPRING, STATIC ELECTRIC"	
163	PFDG1007Z	"GEAR, IDLER"	
164	PFMD1016Y	"COVER, MAIN"	
165	PFDN1004Z	"ROLLER, SEPARATION"	
166	PQUS10055Z	"SPRING, ONE WAY"	
167	PFDG1012Z	"GEAR, SEPARATION ROLLER"	
168	PFJQ1011Z	TX MOTOR	
169	PFDG1031Y	"GEAR, IDLER”	
170	PFUS1018X	"SPRING, STATIC ELECTRIC”	
171	PFDG1039Y	"GEAR, RIBBON DRIVE”	
172	PFDG1076Z	"GEAR, IDLER”	
173	PFDG1075Z	"GEAR, IDLER”	
174	PFUA1013Z	"CHASSIS, RX GEAR”	
175	PFDF1019Y	"SHAFT, PARALELL PIN"	
176	PFDX1011Y	"GEAR, WIND TORQUE LIMITER"	
177	PFJQ1014Y	RX MOTOR	
178	PFDR1005Z	"ROLLER, DUMPER"	
179	PFJS03R57Z	"CONNECTOR, 3 PIN"	
			S
180	PFUS1071Z	"SPRING, OPEN BUTTON"	
181	PFHR1048Z	"ARM, STOPPER"	
182	PFJS06Q01Z	"CONNECTOR, 6 PIN"	
183	PFJS09R56Z	"CONNECTOR, 9 PIN"	
184	PFHX1139Z	"COVER, ROLLING SHEET"	
185	PFHR1044Z	"GUIDE, DUMPER HOLDER"	
186	PFYTFP200M	OPEN BUTTON ASS´Y	
187	PQFN51Z	WASHER	
188	PFDG1029Y	"GEAR, RIBBON DRIVE"	
189	PFQT1221Z	INDICATION LABEL	
190	PFHX1171Z	"COVER, VIBRATION SHEET"	
191	PQLB1C1	FERRITE CORE	
		(12.5. CCD UNIT SECTION)	
200	PFWLF780M	CHASSIS ASS´Y	
200-1	PFVDSLA30222	LED ARRAY	
201	PF0G1001Z	TARGET GLASS	
202	PFUS1021Z	SPRING	
203	PF0L1001Z	LENS	
204	PFHE1004Z	NUT	
205	PFJS08R58Z	"CONNECTOR, 8P"	
206	PFMD1007Z	COVER	
207	PFUS1028Z	SPRING	
208	PF0M1003Z	"MIRROR, SMALL"	
209	PF0M1001Z	"MIRROR, LARGE"	
210	PF0M1002Z	"MIRROR, MIDDLE"	
		(12.7. ACCESSORIES AND PACKING MATERIALS)	
A1	PFJXE0305Z	HANDSET	
A2	PFJA1005Z	"CORD, TEL"	
A3	PQJA10038Y	"POWER CORD, AC”	⚠
A4	PFJA1029Z	"CORD, HANDSET"	
A5	PFJA1010Z	ADAPTOR CORD	
A6	PFQX1296X	INSTRUCTION BOOK	⚠
A7	PFJK102A1121	CD-ROM (KX-FM330G)	
A8	PFQX1309Z	INSTRUCTION BOOK for CD-ROM	
		(KX-FM330G)	
P1	PFPK1513Z-M	PACKING CASE (KX-FP320G)	
P1	PFPK1514Z-M	PACKING CASE (KX-FM330G)	
P2	PFPN1114Z	CUSHION-A	
P3	PFPN1115Z	CUSHION-B	
P4	PFPH1011Z	SOFT SHEET	
P5	PFPN1116Z	UPPER PAD	
P6	XZB32X45A04	"BAG, POLYETHYLENE"	
P7	XZB20X20A04	"BAG, POLYETHYLENE"	
P8	XZB20X35A04	"BAG, POLYETHYLENE"	
P9	XZB21X43A04	"BAG, POLYETHYLENE"	
P10	PFPD1092Z	"CUSHION, STOPPER"	

14.2. DIGITAL BOARD PARTS

14.2.1. DIGITAL BOARD PARTS (for KX-FP320G)

Ref. No.	Part No.	Part Name & DescriptionDIGITAL BOARD PARTS	Remarks
PCB1	PFWP1FP320G	DIGITAL BOARD ASS´Y (RTL)	

Ref. No.	Part No.	Part Name & DescriptionDIGITAL BOARD PARTS	Remarks
		(ICS)	
IC501	PFVIM66410G1	IC	
IC502	PFWIFP320G1	IC (ROM)	
IC503	MN41480CSJ07	IC	S
IC504	PFVIGM6256FF	IC	S
IC505	PFVIR675813	IC	
IC509	PFVIS80842AN	IC	
IC801	PQVITC4066BF	IC	S
IC803	PQVINJM4558M	IC	S
IC901	PFVIKM29W4AT	IC	
IC903	PFVIMM1385EN	IC	
IC904	PFVITVT245FT	IC	
		(TRANSISTORS)	
Q504	PQVTDTC114EU	TRANSISTOR(SI)	
Q507	2SB1197K	TRANSISTOR(SI)	
Q510	2SC4155R	TRANSISTOR(SI)	
Q511	2SB1197K	TRANSISTOR(SI)	
Q512	2SC4155R	TRANSISTOR(SI)	
Q513	2SC4155R	TRANSISTOR(SI)	
Q514	2SC4155R	TRANSISTOR(SI)	
Q515	2SB709A	TRANSISTOR(SI)	
Q516	2SB709A	TRANSISTOR(SI)	
Q517	2SC4155R	TRANSISTOR(SI)	
Q518	2SC4155R	TRANSISTOR(SI)	
		(DIODES)	
D508	RLS71	DIODE(SI)	
DA501	MA141WK	DIODE(SI)	
		(BATTERY)	
BAT501	PQPCR2032H09	BATTERY	S
		(CONNECTORS)	
CN501	PQJP11A19Z	"CONNECTOR, 11P"	
CN502	PQJP11A19Z	"CONNECTOR, 11P"	
CN503	PQJP07A19Z	"CONNECTOR, 7P"	
CN504	PQJP03G100Z	“CONNECTOR, 3P"	
CN505	PQJP3G30Y	"CONNECTOR, 3P"	
CN507	PQJP11G30Y	"CONNECTOR, 11P"	
CN508	PFJP08A12Z	"CONNECTOR, 8P"	
CN510	PQJP9G30Y	"CONNECTOR, 9P"	
CN511	PQJP06G100	"CONNECTOR, 6P"	
		(COILS)	
L510	PQLQR1RM601	COIL	
L511	PQLQR1RM601	COIL	
L512	PQLQR1RM601	COIL	
L513	PQLQR1RM601	COIL	
L514	PQLQR1RM601	COIL	
L515	PQLQR1RM601	COIL	

Ref. No.	Part No.	Part Name & DescriptionDIGITAL BOARD PARTS	Remarks
L516	PQLQR1RM601	COIL	
L517	PQLQR1RM601	COIL	
L518	PQLQR1RM601	COIL	
L519	PQLQR1RM601	COIL	
L520	PQLQR1RM601	COIL	
L521	PQLQR1RM601	COIL	
L524	PQLQR1ET	COIL	
L525	PQLQR1RM601	COIL	
R511	PQLQR2KA113T	COIL	
R512	PQLQR2KA113T	COIL	
R513	PQLQR2KA113T	COIL	
R514	PQLQR2KA113T	COIL	
R515	PQLQR2KA113T	COIL	
R516	PQLQR2KA113T	COIL	
R549	PQLQR2KA113T	COIL	
L901	PQLQR1ET	COIL	
L902	PQLQR1ET	COIL	
L904	PQLQR1ET	COIL	
L905	PQLQR1RM601	COIL	
L906	PQLQR1RM601	COIL	
L907	PQLQR1RM601	COIL	
		(CERAMIC FILTERS)	
L908	PFVF2B222ST	CERAMIC FILTER	
L909	PFVF2B222ST	CERAMIC FILTER	
LF901	EXCEMT222D	CERAMIC FILTER	
R513	PFVF2B222ST	CERAMIC FILTER	
		(CRYSTAL OSCILLATIONS)	
X501	PFVCCFS32Z	CRYSTAL OSCILLATOR	
X502	PFVCCSA24Z	CRYSTAL OSCILLATOR	
X901	PFVC32256ZAT	CRYSTAL OSCILLATOR	
		(COMPONENTS COMBINATIONS)	
RA501	EXRV8V101JV	COMPONENTS PARTS	
RA502	EXRV8V101JV	COMPONENTS PARTS	
RA503	EXRV8V101JV	COMPONENTS PARTS	
RA504	EXRV8V101JV	COMPONENTS PARTS	
RA505	EXRV8V101JV	COMPONENTS PARTS	
RA508	EXRV8V101JV	COMPONENTS PARTS	
RA601	EXRV8V101JV	COMPONENTS PARTS	
RA602	EXRV8V101JV	COMPONENTS PARTS	
RA603	EXRV8V471JV	COMPONENTS PARTS	
RA604	EXRV8V471JV	COMPONENTS PARTS	
RA605	EXRV8V101JV	COMPONENTS PARTS	
RA606	EXRV8V101JV	COMPONENTS PARTS	
		(RESISTORS)	
C631	ERJ3GEY0R00	0	
C701	ERJ3GEY0R00	0	
C942	ERJ6GEY0R00	0	
J604	ERJ3GEYJ103	0	
J606	ERJ3GEY0R00	0	

Ref. No.	Part No.	Part Name & DescriptionDIGITAL BOARD PARTS	Remarks
J609	ERJ8GEY0R00	0	
J611	ERJ3GEY0R00	0	
L522	ERJ3GEY0R00	0	
R505	ERJ3GEYJ223	22k	
R506	ERJ3GEYJ823	82k	
R509	ERJ3GEYJ102	1k	
R510	ERJ3GEYJ102	1k	
R511	ERJ3GEYJ101	100	
R512	ERJ3GEYJ101	100	
R514	ERJ3GEYJ101	100	
R515	ERJ3GEYJ101	100	
R516	ERJ3GEYJ101	100	
R519	ERJ3GEYJ101	100	
R520	ERJ3GEYJ101	100	
R521	ERJ3GEYJ271	270	
R522	ERJ3GEYJ472	4.7k	
R523	ERJ3GEYJ101	100	
R524	ERJ3GEYJ101	100	
R525	ERJ3GEYJ101	100	
R526	ERJ3GEYJ203	20k	
R528	ERJ3GEYJ153	15k	
R531	ERJ3GEYJ473	47k	
R533	ERJ3GEYJ473	47k	
R540	ERJ3GEYJ153	15k	
R542	ERJ3GEY0R00	0	
R546	ERJ3GEY0R00	0	
R549	ERJ3GEY0R00	0	
R550	ERJ3GEYJ101	100	
R551	ERJ3GEYJ101	100	
R552	ERJ3GEYJ101	100	
R554	ERJ3GEYJ472	4.7k	
R555	ERJ3GEYJ101	100	
R556	ERJ3GEYJ101	100	
R557	ERJ3GEYJ101	100	
R558	ERJ3GEY0R00	0	
R563	ERJ3GEYJ270	27	
R565	ERJ3GEYJ222	2.2k	
R567	ERJ3GEYJ222	2.2k	
R568	ERJ3GEYJ101	100	
R569	ERJ3GEYJ101	100	
R570	ERJ3GEYJ101	100	
R571	ERJ3GEYJ105	1M	
R572	ERJ3GEY0R00	0	
R573	ERJ3GEYJ223	22k	
R576	ERJ3GEYJ222	2.2k	
R577	ERJ3GEYJ122	1.2k	
R578	ERJ3GEYJ221	220	
R579	ERJ3GEYJ122	1.2k	
R581	ERJ3GEYJ821	820	
R582	ERJ3GEYJ103	10k	
R584	ERJ3GEYJ472	4.7k	
R585	PQ4R10XJ912	9.1k	S
R586	ERJ3GEYJ223	22k	
R587	ERJ3GEYJ104	100k	
R588	ERJ3GEYJ104	100k	
R594	ERJ3GEYJ472	4.7k	
R595	ERJ3GEYJ563	56k	
R596	ERJ3GEYJ103	10k	
R597	ERJ3GEYJ104	100k	
R598	ERJ3GEYJ472	4.7k	
R599	ERJ3GEYJ103	10k	

Ref. No.	Part No.	Part Name & DescriptionDIGITAL BOARD PARTS	Remarks
R600	ERJ3GEYJ331	330	
R603	ERJ3GEYJ103	10k	
R604	ERJ3GEYJ331	330	
R606	ERJ3GEYJ563	56k	
R607	ERJ3GEYJ562	5.6k	
R626	ERJ3GEYJ224	220k	
R627	ERJ3GEYJ224	220k	
R631	ERJ3GEYJ103	10k	
R633	ERJ3GEYJ104	100k	
R634	ERJ3GEYJ104	100k	
R636	ERJ3GEYJ101	100	
R637	ERJ3GEYJ472	4.7k	
R638	ERJ3GEYJ472	4.7k	
R643	ERJ3GEYJ101	100	
R644	ERJ3GEYJ101	100	
R648	ERJ3GEYJ472	4.7k	
R649	ERJ3GEYJ101	100	
R653	ERJ3GEYJ103	10k	
R654	ERJ3GEYJ103	10k	
R704	PQ4R10XJ681	680	S
R705	ERJ3GEYJ101	100	
R706	ERJ3GEYJ101	100	
R707	ERJ3GEYJ822	8.2k	
R708	ERJ3GEY0R00	0	
R709	ERJ3GEY0R00	0	
R710	ERJ3GEY0R00	0	
R712	ERJ3GEYJ224	220k	
R713	ERJ3GEYJ224	220k	
R714	ERJ3GEYJ331	330	
R715	ERJ3GEYJ101	100	
R716	ERJ3GEYJ101	100	
R720	ERJ3GEY0R00	0	
R730	ERJ3GEYJ472	4.7k	
R806	ERJ3GEYJ473	47k	
R807	ERJ3GEYJ154	150k	
R808	ERJ3GEYJ103	10k	
R809	ERJ3GEYJ123	12k	
R900	PQ4R18XJ8R2	8.2	S
R901	ERJ3GEYJ101	100	
R902	ERJ3GEYJ101	100	
R903	ERJ3GEYJ472	4.7k	
R904	ERJ3GEYJ101	100	
R905	ERJ3GEYJ103	10k	
R906	ERJ3GEYJ472	4.7k	
R907	ERJ3GEYJ151	150	
R908	ERJ3GEY0R00	0	
R910	ERJ3GEYJ272	2.7k	
R911	ERJ3GEYJ103	10k	
R912	ERJ3GEYJ103	10k	
R913	ERJ3GEYJ103	10k	
R916	ERJ3GEYJ103	10k	
R917	ERJ3GEYJ103	10k	
R920	ERJ3GEYJ103	10k	
R921	ERJ3GEYJ101	100	
R922	ERJ3GEY0R00	0	
R923	ERJ3GEYJ102	1k	
R924	ERJ3GEYJ222	2.2k	
R925	ERJ3GEYJ103	10k	

Ref. No.	Part No.	Part Name & DescriptionDIGITAL BOARD PARTS	Remarks
R927	ERJ3GEYJ101	100	
R928	ERJ3GEYJ103	10k	
R929	ERJ3GEYJ103	10k	
R930	ERJ3GEYJ103	10k	
R931	ERJ3GEYJ103	10k	
R932	ERJ3GEYJ103	10k	
R933	ERJ3GEYJ103	10k	
R934	ERJ3GEYJ103	10k	
R935	ERJ3GEYJ103	10k	
R936	ERJ3GEYJ224	220k	
R937	ERJ3GEYJ152	1.5k	
R939	ERJ3GEY0R00	0	
R940	ERJ3GEYJ104	100k	
R941	ERJ3GEYJ224	220k	
		(CAPASITORS)	
C503	ECUV1H561JCV	560P	
C509	ECUV1H222KBV	0.0022	
C511	ECUV1C104KBV	0.1	
C512	ECUV1H104ZFV	0.1	S
C515	ECUV1H102KBV	0.001	
C516	ECUV1H102KBV	0.001	
C520	ECUV1H104ZFV	0.1	S
C521	ECUV1H104ZFV	0.1	S
C522	ECUV1H104ZFV	0.1	S
C523	ECUV1C224ZFV	0.22	
C524	ECUV1H104ZFV	0.1	S
C525	ECUV1H104ZFV	0.1	S
C526	ECUV1H104ZFV	0.1	S
C527	ECUV1H104ZFV	0.1	S
C528	ECUV1H104ZFV	0.1	S
C529	ECUV1H104ZFV	0.1	S
C530	ECUV1H104ZFV	0.1	S
C531	ECUV1H150JCV	15P	
C537	ECUV1H104ZFV	0.1	S
C538	ECUV1H150JCV	15P	
C541	ECUV1C104KBV	0.1	
C542	ECUV1H104ZFV	0.1	S
C543	ECUV1H104ZFV	0.1	S
C544	ECUV1H104ZFV	0.1	S
C545	ECUV1H104ZFV	0.1	S
C546	ECUV1H104ZFV	0.1	S
C547	ECUV1H104ZFV	0.1	S
C548	ECUV1H104ZFV	0.1	S
C561	ECUV1H100DCV	10P	S
C562	ECUV1H180JCV	18P	
C564	ECUV1C104KBV	0.1	
C565	ECUV1H104ZFV	0.1	S
C567	ECUV1H104ZFV	0.1	S
C568	ECUV1C224ZFV	0.22	
C569	ECUV1C224ZFV	0.22	
C572	ECUV1C224ZFV	0.22	
C573	ECUV1C224ZFV	0.22	
C576	ECUV1H102KBV	0.001	
C577	ECUV1H102KBV	0.001	
C579	ECUV1H330JCV	33P	
C583	ECUV1H104ZFV	0.1	S
C584	ECUV1H333KDV	0.033	S
C595	ECUV1H333KDV	0.033	S

Ref. No.	Part No.	Part Name & DescriptionDIGITAL BOARD PARTS	Remarks
C600	PQCUV1H105JC	1	S
C603	ECUV1A224KBV	0.22	
C614	ECUV1H104ZFV	0.1	S
C620	ECUV1H104ZFV	0.1	S
C622	ECEA1VKA470	47	
C623	ECUV1H471JCV	470P	
C624	ECUV1H104ZFV	0.1	S
C626	ECUV1H102KBV	0.001	
C628	ECUV1H104ZFV	0.1	S
C635	ECUV1H120JCV	12P	
C700	ECUV1H562KBV	0.0056	
C703	ECUV1H472KBV	0.0047	
C704	ECUV1H104ZFV	0.1	S
C706	PQCUV1E104MD	0.1	S
C712	ECUV1H104ZFV	0.1	S
C805	PQCUV1C224KB	0.22	
C806	ECUV1H470JCV	47P	
C807	ECUV1C104KBV	0.1	
C808	ECUV1H181JCV	180P	
C901	ECEA1HKS4R7	4.7	S
C902	PQCUV1C224KB	0.22	S
C903	ECUV1H104ZFV	0.1	S
C904	ECUV1H103KBV	0.01	
C906	ECUV1H104ZFV	0.1	S
C907	ECUV1H100DCV	10P	S
C908	ECUV1H100DCV	10P	S
C909	PQCUV1C224KB	0.22	S
C910	ECEA1CKS100	10	S
C912	ECUV1H104ZFV	0.1	S
C913	ECEA1CKS100	10	S
C918	ECUV1H104ZFV	0.1	S
C919	ECEA1CKS100	10	S
C920	PQCUV1E104MD	0.1	S
C921	ECEA1CKS100	10	S
C922	PQCUV1E104MD	0.1	S
C923	ECEA1CKS100	10	S
C925	PQCUV1C224KB	0.22	
C926	PQCUV1E104MD	0.1	S
C927	PQCUV1E104MD	0.1	S
C928	ECEA1CKS100	10	S
C929	ECEA1CKS100	10	S
C930	PQCUV1H103KB	0.01	
C931	ECUV1H104ZFV	0.1	S
C932	ECUV1H104ZFV	0.1	S
C934	ECEA0JKS101	100	
C935	ECUV1H104ZFV	0.1	S
C938	ECUV1C104KBV	0.1	
C939	ECUV1H104ZFV	0.1	S
C940	ECEA1CKS100	10	S
C941	PQCUV1C224KB	0.22	
C943	ECUV1A224KBV	0.22	
C944	PQCUV1H105JC	1	S
C947	ECUV1H104ZFV	0.1	S
C948	ECUV1A224KBV	0.22	

14.2.2. DIGITAL BOARD PARTS (for KX-FM330G)

Ref. No.	Part No.	Part Name & DescriptionDIGITAL BOARD PARTS	Remarks
PCB1	PFWP1FM330G	DIGITAL BOARD ASS´Y (RTL)	
		(ICS)	
IC501	PFVIM66410G1	IC	
IC502	PFWIFM330G1	IC (ROM)	
IC503	MN41480CSJ07	IC	S
IC504	PFVIGM6256FF	IC	S
IC505	PFVIR675813	IC	
IC506	PFVIMC1489AM	IC	
IC507	PFVIMC1488ML	IC	
IC509	PFVIS80842AN	IC	
IC801	PQVITC4066BF	IC	S
IC803	PQVINJM4558M	IC	S
IC901	PFVIKM29W4AT	IC	
IC903	PFVIMM1385EN	IC	
IC904	PFVITVT245FT	IC	
		(TRANSISTORS)	
Q501	2SD1994A	TRANSISTOR(SI)	
Q502	2SD874A	TRANSISTOR(SI)	
Q503	2SD874A	TRANSISTOR(SI)	
Q504	PQVTDTC114EU	TRANSISTOR(SI)	
Q507	2SB1197K	TRANSISTOR(SI)	
Q510	2SC4155R	TRANSISTOR(SI)	
Q511	2SB1197K	TRANSISTOR(SI)	
Q512	2SC4155R	TRANSISTOR(SI)	
Q513	2SC4155R	TRANSISTOR(SI)	
Q514	2SC4155R	TRANSISTOR(SI)	
Q515	2SB709A	TRANSISTOR(SI)	
Q516	2SB709A	TRANSISTOR(SI)	
Q517	2SC4155R	TRANSISTOR(SI)	
Q518	2SC4155R	TRANSISTOR(SI)	
		(DIODES)	
D501	RLS71	DIODE(SI)	
D503	RLS71	DIODE(SI)	
D504	RLS71	DIODE(SI)	
D505	RLS71	DIODE(SI)	
D508	RLS71	DIODE(SI)	
DA501	MA141WK	DIODE(SI)	
		(BATTERY)	
BAT501	PQPCR2032H09	BATTERY	S
		(CONNECTORS)	
CN501	PQJP11A19Z	"CONNECTOR, 11P"	
CN502	PQJP11A19Z	"CONNECTOR, 11P"	
CN503	PQJP07A19Z	"CONNECTOR, 7P"	
CN504	PQJP03G100Z	"CONNECTOR, 3P"	
CN505	PQJP3G30Y	"CONNECTOR, 3P"	
CN507	PQJP11G30Y	"CONNECTOR, 11P"	
CN508	PFJP08A12Z	"CONNECTOR, 8P"	
CN509	PFJS25A05Y	"CONNECTOR, 25P"	
CN510	PQJP9G30Y	"CONNECTOR, 9P"	
CN511	PQJP06G100	"CONNECTOR, 6P"	
		(COILS)	
L501-L506	PQLQR1RM601	COIL	
L508-L509	PQLQR1RM601	COIL	
L510-L519	PQLQR1RM601	COIL	
L520-L521	PQLQR1RM601	COIL	
L521	PQLQR1RM601	COIL	
L524	PQLQR1ET	COIL	
L525	PQLQR1RM601	COIL	
L901	PQLQR1ET	COIL	
L902	PQLQR1ET	COIL	
L904	PQLQR1ET	COIL	
L905	PQLQR1RM601	COIL	
L906	PQLQR1RM601	COIL	
L907	PQLQR1RM601	COIL	
		(CERAMIC FILTERS)	
L908	PFVF2B222ST	CERAMIC FILTER	
L909	PFVF2B222ST	CERAMIC FILTER	
LF901	EXCEMT222D	CERAMIC FILTER	
R513	PFVF2B222ST	CERAMIC FILTER	
		(CRYSTAL OSCILLATIONS)	
X501	PFVCCFS32Z	CRYSTAL OSCILLATOR	
X502	PFVCCSA24Z	CRYSTAL OSCILLATOR	
X901	PFVC32256ZAT	CRYSTAL OSCILLATOR	
		(COMPONENTS COMBINATIONS)	
RA501	EXRV8V101JV	COMPONENTS PARTS	
RA502	EXRV8V101JV	COMPONENTS PARTS	
RA503	EXRV8V101JV	COMPONENTS PARTS	
RA504	EXRV8V101JV	COMPONENTS PARTS	
RA505	EXRV8V101JV	COMPONENTS PARTS	
RA508	EXRV8V101JV	COMPONENTS PARTS	
RA601	EXRV8V101JV	COMPONENTS PARTS	
RA602	EXRV8V101JV	COMPONENTS PARTS	
RA603	EXRV8V471JV	COMPONENTS PARTS	
RA604	EXRV8V471JV	COMPONENTS PARTS	
RA605	EXRV8V101JV	COMPONENTS PARTS	
RA606	EXRV8V101JV	COMPONENTS PARTS	
		(RESISTORS)	
C631	ERJ3GEY0R00	0	
C701	ERJ3GEY0R00	0	
C942	ERJ6GEY0R00	0	

Ref. No.	Part No.	Part Name & DescriptionDIGITAL BOARD PARTS	Remarks
J604	ERJ3GEYJ103	0	
J606	ERJ3GEY0R00	0	
J609	ERJ8GEY0R00	0	
J611	ERJ3GEY0R00	0	
L522	ERJ3GEY0R00	0	
R502	ERJ3GEY0R00	0	
R503	PQ4R10XJ220	22	S
R505	ERJ3GEYJ223	22k	
R506	ERJ3GEYJ823	82k	
R507	ERJ3GEYJ682	6.8k	
R508	ERJ3GEYJ822	8.2k	
R509	ERJ3GEYJ102	1k	
R510	ERJ3GEYJ102	1k	
R511	ERJ3GEYJ101	100	
R512	ERJ3GEYJ101	100	
R514	ERJ3GEYJ101	100	
R515	ERJ3GEYJ101	100	
R516	ERJ3GEYJ101	100	
R517	PQ4R10XJ102	1k	S
R518	PQ4R10XJ4R7	4.7	S
R519	ERJ3GEYJ101	100	
R520	ERJ3GEYJ101	100	
R521	ERJ3GEYJ271	270	
R522	ERJ3GEYJ472	4.7k	
R523	ERJ3GEYJ101	100	
R524	ERJ3GEYJ101	100	
R525	ERJ3GEYJ101	100	
R526	ERJ3GEYJ203	20k	
R527	ERJ3GEYJ682	6.8k	
R528	ERJ3GEYJ153	15k	
R529	PQ4R10XJ150	15	
R531	ERJ3GEYJ473	47k	
R532	ERJ3GEYJ392	3.9k	
R533	ERJ3GEYJ473	47k	
R537	ERJ3GEYJ392	3.9k	
R540	ERJ3GEYJ153	15k	
R542	ERJ3GEY0R00	0	
R546	ERJ3GEY0R00	0	
R549	ERJ3GEY0R00	0	
R550	ERJ3GEYJ101	100	
R551	ERJ3GEYJ101	100	
R552	ERJ3GEYJ101	100	
R554	ERJ3GEYJ472	4.7k	
R555	ERJ3GEYJ101	100	
R556	ERJ3GEYJ101	100	
R557	ERJ3GEYJ101	100	
R558	ERJ3GEY0R00	0	
R563	ERJ3GEYJ270	27	
R565	ERJ3GEYJ222	2.2k	
R567	ERJ3GEYJ222	2.2k	
R568	ERJ3GEYJ101	100	
R569	ERJ3GEYJ101	100	
R570	ERJ3GEYJ101	100	
R571	ERJ3GEYJ105	1M	
R572	ERJ3GEY0R00	0	
R573	ERJ3GEYJ223	22k	
R576	ERJ3GEYJ222	2.2k	
R577	ERJ3GEYJ122	1.2k	
R578	ERJ3GEYJ221	220	
R579	ERJ3GEYJ122	1.2k	

Ref. No.	Part No.	Part Name & DescriptionDIGITAL BOARD PARTS	Remarks
R581	ERJ3GEYJ821	820	
R582	ERJ3GEYJ103	10k	
R584	ERJ3GEYJ472	4.7k	
R585	PQ4R10XJ912	9.1k	S
R586	ERJ3GEYJ223	22k	
R587	ERJ3GEYJ104	100k	
R588	ERJ3GEYJ104	100k	
R594	ERJ3GEYJ472	4.7k	
R595	ERJ3GEYJ563	56k	
R596	ERJ3GEYJ103	10k	
R597	ERJ3GEYJ104	100k	
R598	ERJ3GEYJ472	4.7k	
R599	ERJ3GEYJ103	10k	
R600	ERJ3GEYJ331	330	
R603	ERJ3GEYJ103	10k	
R604	ERJ3GEYJ331	330	
R606	ERJ3GEYJ563	56k	
R607	ERJ3GEYJ562	5.6k	
R626	ERJ3GEYJ224	220k	
R627	ERJ3GEYJ224	220k	
R631	ERJ3GEYJ103	10k	
R633	ERJ3GEYJ104	100k	
R634	ERJ3GEYJ104	100k	
R636	ERJ3GEYJ101	100	
R637	ERJ3GEYJ472	4.7k	
R638	ERJ3GEYJ472	4.7k	
R643	ERJ3GEYJ101	100	
R644	ERJ3GEYJ101	100	
R648	ERJ3GEYJ472	4.7k	
R649	ERJ3GEYJ101	100	
R653	ERJ3GEYJ103	10k	
R654	ERJ3GEYJ103	10k	
R704	PQ4R10XJ681	680	S
R705	ERJ3GEYJ101	100	
R706	ERJ3GEYJ101	100	
R707	ERJ3GEYJ822	8.2k	
R708	ERJ3GEY0R00	0	
R709	ERJ3GEY0R00	0	
R710	ERJ3GEY0R00	0	
R712	ERJ3GEYJ224	220k	
R713	ERJ3GEYJ224	220k	
R714	ERJ3GEYJ331	330	
R715	ERJ3GEYJ101	100	
R716	ERJ3GEYJ101	100	
R720	ERJ3GEY0R00	0	
R730	ERJ3GEYJ472	4.7k	
R806	ERJ3GEYJ473	47k	
R807	ERJ3GEYJ154	150k	
R808	ERJ3GEYJ103	10k	
R809	ERJ3GEYJ104	100k	
R900	PQ4R18XJ8R2	8.2	S
R901	ERJ3GEYJ101	100	
R902	ERJ3GEYJ101	100	
R903	ERJ3GEYJ472	4.7k	
R904	ERJ3GEYJ101	100	
R905	ERJ3GEYJ103	10k	
R906	ERJ3GEYJ472	4.7k	
R907	ERJ3GEYJ151	150	
R908	ERJ3GEY0R00	0	

Ref. No.	Part No.	Part Name & DescriptionDIGITAL BOARD PARTS	Remarks
R910	ERJ3GEYJ272	2.7k	
R911	ERJ3GEYJ103	10k	
R912	ERJ3GEYJ103	10k	
R913	ERJ3GEYJ103	10k	
R916	ERJ3GEYJ103	10k	
R917	ERJ3GEYJ103	10k	
R920	ERJ3GEYJ103	10k	
R921	ERJ3GEYJ101	100	
R922	ERJ3GEY0R00	0	
R923	ERJ3GEYJ102	1k	
R924	ERJ3GEYJ222	2.2k	
R925	ERJ3GEYJ103	10k	
R927	ERJ3GEYJ101	100	
R928	ERJ3GEYJ103	10k	
R929	ERJ3GEYJ103	10k	
R930	ERJ3GEYJ103	10k	
R931	ERJ3GEYJ103	10k	
R932	ERJ3GEYJ103	10k	
R933	ERJ3GEYJ103	10k	
R934	ERJ3GEYJ103	10k	
R935	ERJ3GEYJ103	10k	
R936	ERJ3GEYJ224	220k	
R937	ERJ3GEYJ152	1.5k	
R939	ERJ3GEY0R00	0	
R940	ERJ3GEYJ104	100k	
R941	ERJ3GEYJ224	220k	
		(CAPASITORS)	
C501	ECEA1VKA330	33	
C503	ECUV1H561JCV	560P	
C504	ECEA1VKA330	33	
C506	ECEA1VKA100	10	
C508	ECUV1H104ZFV	0.1	S
C509	ECUV1H222KBV	0.0022	
C511	ECUV1C104KBV	0.1	
C512	ECUV1H104ZFV	0.1	S
C515	ECUV1H102KBV	0.001	
C516	ECUV1H102KBV	0.001	
C518	ECUV1H104ZFV	0.1	S
C519	ECUV1H104ZFV	0.1	S
C520	ECUV1H104ZFV	0.1	S
C521	ECUV1H104ZFV	0.1	S
C522	ECUV1H104ZFV	0.1	S
C523	ECUV1C224ZFV	0.22	
C524	ECUV1H104ZFV	0.1	S
C525	ECUV1H104ZFV	0.1	S
C526	ECUV1H104ZFV	0.1	S
C527	ECUV1H104ZFV	0.1	S
C528	ECUV1H104ZFV	0.1	S
C529	ECUV1H104ZFV	0.1	S
C530	ECUV1H104ZFV	0.1	S
C531	ECUV1H150JCV	15P	
C537	ECUV1H104ZFV	0.1	S
C538	ECUV1H150JCV	15P	
C541	ECUV1C104KBV	0.1	
C542	ECUV1H104ZFV	0.1	S
C543	ECUV1H104ZFV	0.1	S
C544	ECUV1H104ZFV	0.1	S
C545	ECUV1H104ZFV	0.1	S
C546	ECUV1H104ZFV	0.1	S

Ref. No.	Part No.	Part Name & DescriptionDIGITAL BOARD PARTS	Remarks
C547	ECUV1H104ZFV	0.1	S
C548	ECUV1H104ZFV	0.1	S
C561	ECUV1H100DCV	10P	S
C562	ECUV1H180JCV	18P	
C564	ECUV1C104KBV	0.1	
C565	ECUV1H104ZFV	0.1	S
C567	ECUV1H104ZFV	0.1	S
C568	ECUV1C224ZFV	0.22	
C569	ECUV1C224ZFV	0.22	
C572	ECUV1C224ZFV	0.22	
C573	ECUV1C224ZFV	0.22	
C576	ECUV1H102KBV	0.001	
C577	ECUV1H102KBV	0.001	
C579	ECUV1H330JCV	33P	
C583	ECUV1H104ZFV	0.1	S
C584	ECUV1H333KDV	0.033	S
C595	ECUV1H333KDV	0.033	S
C600	PQCUV1H105JC	1	S
C603	ECUV1A224KBV	0.22	
C614	ECUV1H104ZFV	0.1	S
C620	ECUV1H104ZFV	0.1	S
C622	ECEA1VKA470	47	
C623	ECUV1H471JCV	470P	
C624	ECUV1H104ZFV	0.1	S
C626	ECUV1H102KBV	0.001	
C628	ECUV1H104ZFV	0.1	S
C635	ECUV1H120JCV	12P	
C700	ECUV1H562KBV	0.0056	
C703	ECUV1H472KBV	0.0047	
C704	ECUV1H104ZFV	0.1	S
C706	PQCUV1E104MD	0.1	S
C712	ECUV1H104ZFV	0.1	S
C805	PQCUV1C224KB	0.22	
C806	ECUV1H470JCV	47P	
C807	ECUV1H681JCV	680P	
C808	ECUV1H181JCV	180P	
C901	ECEA1HKS4R7	4.7	S
C902	PQCUV1C224KB	0.22	S
C903	ECUV1H104ZFV	0.1	S
C904	ECUV1H103KBV	0.01	
C906	ECUV1H104ZFV	0.1	S
C907	ECUV1H100DCV	10P	S
C908	ECUV1H100DCV	10P	S
C909	PQCUV1C224KB	0.22	S
C910	ECEA1CKS100	10	S
C912	ECUV1H104ZFV	0.1	S
C913	ECEA1CKS100	10	S
C918	ECUV1H104ZFV	0.1	S
C919	ECEA1CKS100	10	S
C920	PQCUV1E104MD	0.1	S
C921	ECEA1CKS100	10	S
C922	PQCUV1E104MD	0.1	S
C923	ECEA1CKS100	10	S
C925	PQCUV1C224KB	0.22	
C926	PQCUV1E104MD	0.1	S
C927	PQCUV1E104MD	0.1	S
C928	ECEA1CKS100	10	S
C929	ECEA1CKS100	10	S

Ref. No.	Part No.	Part Name & DescriptionDIGITAL BOARD PARTS	Remarks
C930	PQCUV1H103KB	0.01	
C931	ECUV1H104ZFV	0.1	S
C932	ECUV1H104ZFV	0.1	S
C934	ECEA0JKS101	100	
C935	ECUV1H104ZFV	0.1	S
C938	ECUV1C104KBV	0.1	
C939	ECUV1H104ZFV	0.1	S
C940	ECEA1CKS100	10	S
C941	PQCUV1C224KB	0.22	
C943	ECUV1A224KBV	0.22	
C944	PQCUV1H105JC	1	S
C947	ECUV1H104ZFV	0.1	S
C948	ECUV1A224KBV	0.22	

14.3. ANALOG BOARD PARTS

Ref. No.	Part No.	Part Name & DescriptionANALOG BOARD PARTS	Remarks
PCB2	PFLP1230GZ	ANALOG BOARD ASS´Y (RTL)	⚠
		(ICS)	
IC2	PQVITC4066BF	IC	S
IC3	PQVINJM2113M	IC	
IC5	AN6116FAQ	IC	
IC6	PQVISN7H244S	IC	S
IC10	PQVINJM4558M	IC	S
IC11	PQVINJM4558M	IC	S
IC12	PQVINJM4558M	IC	S
		(TRANSISTORS)	
Q1	PQVTDTC114EU	TRANSISTOR(SI)	
Q2	PQVTDTC114EU	TRANSISTOR(SI)	
Q3	2SA1627	TRANSISTOR(SI)	
Q7	PQVTDTC143E	TRANSISTOR(SI)	
Q10	2SC2235	TRANSISTOR(SI)	
Q12	PQVTDTC143E	TRANSISTOR(SI)	
Q13	PQVTDTC143E	TRANSISTOR(SI)	
Q14	PQVTDTC143E	TRANSISTOR(SI)	
Q16	2SC1740S	TRANSISTOR(SI)	
Q17	2SD1921Q	TRANSISTOR(SI)	
Q18	PQVTDTC114EU	TRANSISTOR(SI)	
		(DIODES)	
D6	PFVDDGS1ZB60	DIODE(SI)	
D7	MA143	DIODE(SI)	
D9	MA4180	DIODE(SI)	
D20	RLS71	DIODE(SI)	
D21	MA4056	DIODE(SI)	
D22	MA4056	DIODE(SI)	
D25	MA143	DIODE(SI)	
D27	RLS71	DIODE(SI)	
D28	RLS71	DIODE(SI)	

Ref. No.	Part No.	Part Name & DescriptionANALOG BOARD PARTS	Remarks
D29	RLS71	DIODE(SI)	
D30	MA143	DIODE(SI)	
D32	RLS71	DIODE(SI)	
		(CONNECTORS)	
CN3	PQJP2G30Z	"CONNECTOR, 2P"	
CN4	PQJP02G100Z	"CONNECTOR, 2P"	
CN6	PQJP08B11Z	"CONNECTOR, 8P"	
CN7	PQJS11A10Z	"CONNECTOR, 11P"	
CN8	PQJS11A10Z	"CONNECTOR, 11P"	
CN9	PQJS07A10Z	"CONNECTOR, 7P"	
CN30	PFJP02A09Z	"CONNECTOR, 2P"	
		(JACKS)	
CN1	PQJJ1TC5Z	JACK	S
CN2	PQJJ1TC5Z	JACK	
CN5	PQJJ1TB18Z	JACK	
		(COILS)	
L1	PQLQR1E32A07	COIL	
L2	PQLQR1E32A07	COIL	
L4	PQLQR1ET	COIL	
L5	PQLQR1ET	COIL	
L6	PFLE003	COIL	S
L7	PQLQXD152K	COIL	
L9	PQLQXD152K	COIL	
L11	PQLQR2BT	COIL	S
L35	PQLQR2BT	COIL	S
L36	PQLQR2BT	COIL	S
L37	PQLQR2BT	COIL	S
L38	PQLQR2BT	COIL	S
		(RESISTORS)	
D19	ERDS2TJ000	0	
C145	ERJ6GEY0R00	0	
J2	ERDS2TJ000	0	
J3	ERJ6GEY0R00	0	
J4	ERJ6GEY0R00	0	
J5	ERJ6GEY0R00	0	
J6	ERJ6GEY0R00	0	
J7	ERJ6GEY0R00	0	
J12	ERJ6GEY0R00	0	
J17	ERJ6GEY0R00	0	
J20	ERDS2TJ000	0	
J25	ERJ6GEY0R00	0	
J27	ERJ6GEY0R00	0	
J28	ERJ3GEY0R00	0	
J31	ERJ3GEY0R00	0	
J32	ERJ3GEY0R00	0	
J51	ERJ8GEY0R00	0	
J52	ERJ8GEY0R00	0	
J60	ERJ6GEY0R00	0	

Ref. No.	Part No.	Part Name & DescriptionANALOG BOARD PARTS	Remarks
J62	ERJ6GEY0R00	0	
J63	ERJ3GEY0R00	0	
POS1	ERDS2TJ000	0	
R4	ERJ3GEYJ333	33k	
R7	ERDS1VJ4R7	4.7	
R10	ERDS2TJ223	22k	
R11	ERDS2TJ4R7	4.7	
R13	ERDS1TJ183	18k	
R14	ERDS2TJ000	0	
R15	ERJ3GEYJ103	10k	
R16	ERJ3GEYJ512	5.1k	
R17	PQ4R10XJ104	100k	S
R18	ERJ3GEYJ102	1k	
R20	PQ4R10XJ472	4.7k	S
R24	PQ4R10XJ562	5.6k	S
R29	ERJ3GEYJ473	47k	
R34	ERJ3GEYJ102	1k	
R37	ERJ3GEYJ101	100	
R39	PQ4R10XJ391	390	S
R43	PQ4R10XJ123	12k	S
R44	ERJ3GEYJ152	1.5k	
R46	PQ4R10XJ222	2.2k	S
R48	ERJ3GEYJ154	150k	
R51	ERDS1TJ390	39	S
R52	ERJ6GEY0R00	0	
R57	ER016CKF1801	1.8k	
R58	ER016CKF3301	3.3k	
R59	ERJ3GEYJ563	56k	
R61	ER016CKF1801	1.8k	
R62	ER016CKF3301	3.3k	
R63	ERJ3GEY0R00	0	
R65	ERJ3GEYJ563	56k	
R66	ERDS2TJ331	330	
R70	ERJ3GEYJ184	180k	
R71	ERDS2TJ561	560	
R73	ERJ3GEYJ393	39k	
R74	ERJ3GEYJ114	110k	
R77	ERJ3GEYJ103	10k	
R78	ERJ3GEYJ103	10k	
R79	ERJ3GEYJ474	470k	
R80	ERJ3GEYJ332	3.3k	
R81	ERJ3GEYJ103	10k	
R82	ERJ3GEYJ103	10k	
R83	ERJ3GEYJ103	10k	
R85	ERJ3GEYJ472	4.7k	
R86	ERJ3GEYJ103	10k	
R87	ERJ3GEYJ622	6.2k	
R88	ERJ3GEYJ103	10k	
R89	ERJ3GEY0R00	0	
R90	ERJ3GEYJ224	220k	
R91	ERJ3GEYJ103	10k	
R92	ERJ3GEYJ104	100k	
R93	ERJ3GEYJ104	100k	
R94	ERJ3GEYJ103	10k	
R95	ERJ3GEYJ224	220k	
R102	ERJ3GEYJ102	1k	
R103	ERJ3GEYJ101	100	
R104	ERJ3GEYJ222	2.2k	
R105	ERJ3GEYJ222	2.2k	

Ref. No.	Part No.	Part Name & DescriptionANALOG BOARD PARTS	Remarks
R110	ERJ3GEYJ823	82k	
R112	ERJ3GEYJ472	4.7k	
R114	ERJ3GEYJ101	100	
R119	ERJ3GEYJ563	56k	
R120	ERJ3GEYJ222	2.2k	
R121	ERJ3GEYJ123	12k	
R122	ERJ3GEYJ103	10k	
R123	ERJ3GEYJ114	110k	
R124	ERJ3GEYJ154	150k	
R125	ERDS2TJ4R7	4.7	
R126	ERJ3GEYJ471	470	
R127	ERJ3GEYJ152	1.5k	
R128	ERJ3GEYJ562	5.6k	
R129	ERJ3GEYJ152	1.5k	
R130	ERJ3GEYJ103	10k	
R131	ERJ3GEYJ153	15k	
R132	ERJ3GEYJ392	3.9k	
R133	ERJ3GEYJ102	1k	
R134	ERJ3GEYJ822	8.2k	
R135	ERJ3GEYJ822	8.2k	
R136	ERJ3GEYJ473	47k	
R137	ERJ3GEY0R00	0	
R138	ERJ3GEYJ103	10k	
R139	ERJ3GEYJ103	10k	
R141	ERJ3GEY0R00	0	
R142	ERJ3GEYJ103	10k	
R143	ERJ3GEY0R00	0	
R144	ERJ3GEYJ394	390k	
R145	ERJ3GEYJ103	10k	
R146	ERJ3GEYJ683	68k	
R147	ERJ3GEYJ104	100k	
R149	ERJ3GEYJ103	10k	
R150	ERJ3GEYJ102	1k	
R151	ERJ3GEYJ222	2.2k	
R152	ERJ3GEYJ184	180k	
R153	ERJ3GEYJ513	51k	
R154	ERJ3GEYJ822	8.2k	
R155	ERJ3GEYJ273	27k	
R156	ERJ3GEYJ683	68k	
R157	ERJ3GEYJ392	3.9k	
R158	ERJ3GEYJ473	47k	
R159	ERJ3GEYJ473	47k	
R160	ERJ3GEYJ393	39k	
R161	ERJ3GEYJ473	47k	
R162	ERJ3GEYJ682	6.8k	
R163	ERJ3GEYJ684	680k	
R164	ERJ3GEYJ221	220	
R165	PQ4R10XJ103	10k	S
R166	PQ4R10XJ103	10k	S
R167	ERJ3GEY0R00	0	
R168	ERJ3GEY0R00	0	
R169	ERJ3GEY0R00	0	
R172	ERJ3GEYJ473	47k	
R191	ERJ3GEYJ334	330k	
R192	ERJ3GEYJ332	3.3k	
R193	ERDS1TJ561	560	
		(CAPASITORS)	
D18	ECQG1H123JZ	0.012	
C3	ECEA1HN330S	33	
C4	ECQE2E474KZ	0.47	S
C5	ECQE2104KF	0.1	
C6	ERDS2TJ000	0	

Ref. No.	Part No.	Part Name & DescriptionANALOG BOARD PARTS	Remarks
C7	PQCUV1H273MD	0.027	S
C8	PQCUV1E333MD	0.033	S
C9	PQCUV1E333MD	0.033	S
C10	PQCUV1H273MD	0.027	S
C11	ECUV1H103KBV	0.01	
C12	ECKD2H681KB	680P	S
C13	ECKD2H681KB	680P	S
C16	PQCUV1H332KB	0.0033	
C17	ECEA1CKS101	100	
C26	ECEA1HKS010	1	
C27	PQCUV1E333MD	0.033	S
C29	ECEA1CKS470	47	
C33	ECEA1HKS2R2	2.2	
C34	ECUV1C104KBV	0.1	S
C35	PQCUV1H273MD	0.027	S
C37	ECEA1HU4R7	4.7	
C38	ECEA1HU4R7	4.7	
C39	ECQG1H563JZ	0.056	
C42	ECQG1H563JZ	0.056	
C44	PQCUV1E104MD	0.1	S
C46	ECUV1H331JCV	330P	
C47	PQCUV1E104MD	0.1	S
C48	PQCUV1C224KB	0.22	
C50	ECUV1H101JCV	100P	
C52	ECUV1H151JCV	150P	
C53	PQCUV1E104MD	0.1	S
C54	PQCUV1E104MD	0.1	
C55	ECUV1H392KBV	0.0039	
C56	ECEA1CKS100	10	
C57	PQCUV1C224KB	0.22	S
C58	ECUV1H392KBV	0.0039	
C59	ECEA1HU100	10	S
C60	ECUV1H821KBV	820P	
C61	ECUV1H472KBV	0.0047	
C62	ECUV1H223KBV	0.022	S
C63	ECUV1H332KBV	0.0033	
C64	PQCUV1E104MD	0.1	S
C65	ECUV1H682KBV	0.0068	
C66	ECUV1H222KBV	0.0022	
C67	ECEA1CKS100	10	
C68	PQCUV1E104MD	0.1	S
C69	ERJ3GEYJ103	10K	
C70	ERJ3GEYJ103	10K	
C72	ECUV1H103KBV	0.01	
C73	ECUV1H103KBV	0.01	
C74	ECEA1AU101	100	S
C76	ECUV1H221JCV	220P	S
C77	ECUV1H103KBV	0.01	
C78	ERJ3GEYJ103	10K	
C79	PQCUV1E683KB	0.068	
C80	ECUV1C104KBV	0.1	S
C81	ECEA0JKS101	100	
C82	ECUV1H103KBV	0.01	
C83	PQCUV1H123MD	0.012	S
C84	ECEA1HU4R7	4.7	
C85	ECEA0JK221	220	S
C86	PQCUV1H103KB	0.01	S
C87	ECUV1H472KBV	0.0047	
C88	PQCUV1H105JC	1	S
C89	ECUV1H103KBV	0.01	
C90	PQCUV1H105JC	1	S
C91	PQCUV1C224KB	0.22	S
C93	PQCUV1E473MD	0.047	S

Ref. No.	Part No.	Part Name & DescriptionANALOG BOARD PARTS	Remarks
C94	PQCUV1E473MD	0.047	S
C95	ECUV1H182KBV	0.0018	
C96	PQCUV1E104MD	0.1	S
C98	ECUV1H103KBV	0.01	
C100	PQCUV1C224KB	0.22	S
C102	ECUV1H330JCV	33P	
C103	PQCUV1H103KB	0.01	S
C104	ECUV1H181JCV	180P	
C106	PQCUV1H105JC	1	S
C107	ECEV0JA101	100	
C110	ECEA1AU101	100	S
C111	PQCUV1H105JC	1	S
C112	ECEA1EU470	47	S
C113	PQCUV1E104MD	0.1	S
C114	ECEA1AU101	100	S
C115	PQCUV1H333JC	0.033	S
C116	PQCUV1E104MD	0.1	S
C117	ECUV1H151JCV	150P	
C118	ECUV1H560JCV	56P	
C119	PQCUV1H103KB	0.01	S
C120	PQCUV1C683MD	0.068	
C121	PQCUV1H681JC	680P	S
C122	PQCUV1E104MD	0.1	S
C123	PQCUV1C224KB	0.22	S
C124	ECUV1H271JCV	270P	S
C125	ECUV1H120JCV	12P	
C126	PQCUV1C334KB	0.33	
C127	ECUV1C104KBV	0.1	
C128	ECEA1HU100	10	
C129	PQCUV1H104ZF	0.1	
C131	ECEA1VKA330	33	
C132	ECEA1EKS330	33	S
C134	PQCUV1H103KB	0.01	S
C140	PQCUV1E473MD	0.047	S
C143	ECUV1C104KBV	0.1	S
C144	PQCUV1E104MD	0.1	S
C147	ECEA1AU101	100	S
C148	ECEA1AU101	100	S
C159	PQCUV1C334KB	0.33	
C161	PQCUV1C334KB	0.33	
C164	PQCUV1H104ZF	0.1	
		(PHOTO ELECTRIC TRANSDUCERS)	
IC1	PQXDTHS56F	PHOTO ELECTRIC TRANSDUCER	S ⚠
PC2	PQVITLP620K	PHOTO ELECTRIC TRANSDUCER	⚠
PC3	PQVIPS2532-1	PHOTO ELECTRIC TRANSDUCER	S ⚠
PC6	PQVIPC817CD	PHOTO ELECTRIC TRANSDUCER	
		(VARISTORS)	
SA1	PQVDRA311PT3	VARISTOR	S ⚠ ;
SA2	PFRZ001Z	VARISTOR	⚠
ZNR1	ERZVA7D121	VARISTOR	S ⚠
		(TRANSFORMERS)	
T1	PFLT8E003	TRANSFORMER	⚠
T2	PFLT8E004	TRANSFORMER	⚠

Ref. No.	Part No.	Part Name & DescriptionANALOG BOARD PARTS	Remarks
		(COMPONENTS PARTS)	
L3	EXCELDR35	COMPONENTS PARTS	
RA1	EXRV8V101JV	COMPONENTS PARTS	
RA2	EXRV8V101JV	COMPONENTS PARTS	
		(RELAYS)	
RLY1	ATXD20328	RELAY	⚠
RLY2	PQSL108Z	RELAY	⚠
RLY3	PQSL108Z	RELAY	⚠
		(SWITCH)	
SW3	PFSH1A02Z	"SWITCH, PUSH"	
		(OTHER)	
F1	PQBA1N10NMAL	FUSE	

14.4. OPERATION BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
		OPERATION BOARD PARTS	
PCB3	PFLP1184GZ	OPERATION BOARD ASS´Y (RTL)	
		(ICS)	
IC301	MN53007QAF	IC	
		(DIODES)	
D363	1SS119	DIODE(SI)	
D364	1SS119	DIODE(SI)	
LED301	PQVDR325CA47	DIODE(SI)	S
LED302	PQVDR325CA47	DIODE(SI)	S
LED303	PQVDR325CA47	DIODE(SI)	S
		(CONNECTORS)	
CN301	PQJP11G43Y	"CONNECTOR, 11P"	
CN302	PQJS10X59Z	"CONNECTOR, 10P"	
		(RESISTORS)	
R307	ERJ3GEYJ181	180	
R308	ERJ3GEYJ181	180	
R309	ERJ3GEYJ181	180	
R310	ERJ3GEYJ101	100	
R311	ERJ3GEYJ181	180	
R312	ERJ3GEYJ181	180	
R322	ERJ3GEYJ122	1.2k	
R323	ERJ3GEYJ273	27k	
R332	ERJ3GEYJ471	470	
R333	ERJ3GEYJ471	470	
R334	ERJ3GEYJ471	470	

Ref. No.	Part No.	Part Name & Description	Remarks
R341	ERJ3GEYJ181	180	
R342	ERJ3GEYJ181	180	
R343	ERJ3GEYJ181	180	
R344	ERJ3GEYJ181	180	
R345	ERJ3GEYJ181	180	
R346	ERJ3GEYJ181	180	
R347	ERJ3GEYJ181	180	
R348	ERJ3GEYJ181	180	
R361	ERJ3GEYJ181	180	
R362	ERJ3GEYJ181	180	
R363	ERJ3GEYJ103	10k	
R364	ERJ3GEYJ103	10k	
R366	ERJ3GEYJ181	180	
R381	ERJ3GEYJ563	56k	
R382	ERJ3GEYJ331	330	
R383	ERJ3GEYJ331	330	
R384	ERJ3GEYJ331	330	
R385	ERJ3GEYJ101	100	
R391	ERJ3GEY0R00	0	
R396	ERJ3GEYJ102	1k	
R397	ERJ3GEYJ102	1k	
R398	ERJ3GEYJ103	10k	
		(CAPASITORS)	
C302	ECEA1AKS101	100	
C305	ECUV1H122KBV	0.0012	
C306	ECUV1H331JCV	330P	
C307	ECUV1H331JCV	330P	
C309	ECUV1H331JCV	330P	
C310	ECUV1H331JCV	330P	
C322	ECUV1C104KBV	0.1	S
C331	ECUV1C104KBV	0.1	S
C351	ECUV1C104KBV	0.1	S
C352	ECUV1C104KBV	0.1	S
		(PHOTO ELECTRIC TRANSDUCERS)	
PI301	CNA1006N	PHOTO ELECTRIC TRANSDUCER	
PI302	CNA1006N	PHOTO ELECTRIC TRANSDUCER	
PI303	CNA1006N	PHOTO ELECTRIC TRANSDUCER	
		(SWITCHES)	
SW301	PQSH1A105Z	SWITCH	S
SW302	PQSH1A105Z	SWITCH	S
SW303	PQSH1A105Z	SWITCH	S
SW304	PQSH1A105Z	SWITCH	S
SW305	PQSH1A105Z	SWITCH	S
SW306	PQSH1A105Z	SWITCH	S
SW307	PQSH1A105Z	SWITCH	S
SW308	PQSH1A105Z	SWITCH	S
SW309	PQSH1A105Z	SWITCH	S
SW310	PQSH1A105Z	SWITCH	S
SW311	PQSH1A105Z	SWITCH	S
SW312	PQSH1A105Z	SWITCH	S
SW313	PQSH1A105Z	SWITCH	S
SW314	PQSH1A105Z	SWITCH	S
SW315	PQSH1A105Z	SWITCH	S

Ref. No.	Part No.	Part Name & Description	Remarks
SW316	PQSH1A105Z	SWITCH	S
SW317	PQSH1A105Z	SWITCH	S
SW318	PQSH1A105Z	SWITCH	S
SW319	PQSH1A105Z	SWITCH	S
SW320	PQSH1A105Z	SWITCH	S
SW321	PQSH1A105Z	SWITCH	S
SW322	PQSH1A105Z	SWITCH	S
SW323	PQSH1A105Z	SWITCH	S
SW324	PQSH1A105Z	SWITCH	S
SW325	PQSH1A105Z	SWITCH	S
SW326	PQSH1A105Z	SWITCH	S
SW327	PQSH1A105Z	SWITCH	S
SW328	PQSH1A105Z	SWITCH	S
SW329	PQSH1A105Z	SWITCH	S
SW330	PQSH1A105Z	SWITCH	S
SW331	PQSH1A105Z	SWITCH	S
SW332	PQSH1A105Z	SWITCH	S
SW333	PQSH1A105Z	SWITCH	S
SW334	PQSH1A105Z	SWITCH	S
SW336	PQSH1A105Z	SWITCH	S
SW337	PQSH1A105Z	SWITCH	S
SW350	EVQVEHF1712B	SWITCH	

14.5. POWER SUPPLY BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
		POWER SUPPLY BOARD PARTS	
PCB4	PFLP1206EZL	POWER SUPPLY BOARD ASS´Y (RTL)	⚠
		(ICs)	
IC101	PFVIFA5317P	IC	
IC202	PFVINJM2360A	IC	
		(TRANSISTORS)	
Q101	PFVTFS5KM16A	TRANSISTOR(SI)	⚠
Q201	2SC1740S	TRANSISTOR(SI)	
		(DIODES)	
D101	PFVD1N4005	DIODE(SI)	⚠
D102	PFVD1N4005	DIODE(SI)	⚠ ;
D103	PFVD1N4005	DIODE(SI)	⚠
D104	PFVD1N4005	DIODE(SI)	⚠
D105	PFVDEG01C	DIODE(SI)	
D106	MA165	DIODE(SI)	
D107	PQVDERA1802	DIODE(SI)	
D108	MA4220	DIODE(SI)	
D109	PQVDERA1506	DIODE(SI)	
D110	MA4220	DIODE(SI)	
D201	PFVDSF5LC20U	DIODE(SI)	
D202	MA4075M	DIODE(SI)	
D203	PQVDERA81004	DIODE(SI)	
D204	MA4075M	DIODE(SI)	
D205	MA165	DIODE(SI)	
		(CONNECTORS)	

Ref. No.	Part No.	Part Name & Description	Remarks
CN31	PQJP2D98Z	CONNECTOR	⚠
CN301	PQJP6G100Z	CONNECTOR	⚠
CN302	PQJS08A36Z	CONNECTOR	⚠
		(COILS)	
L101	ELF18D290	COIL	
L102	ELF18D290	COIL	
L103	EXCELDR35	COIL	
L201	PFLEC10	COIL	
L202	PQLQ681388A	COIL	
L204	PQLE53	COIL	
		(VARISTORS)	
ZNR101	ERZV10DK750U	VARISTOR	⚠
ZNR102	ERZV10DK471U	VARISTOR	⚠
ZNR103	ERZV10DK471U	VARISTOR	⚠
		(PHOTO COUPLER)	
PC101	0N3171	PHOTO COUPLER	
		(RESISTORS)	
R101	ERDS1J105	1M	
R102	ERDS2TJ823	82k	
R103	ERDS2TJ823	82k	
R104	ERG2SJ104	100k	
R105	ERX2SJR22	0.22	
R106	ERDS2FJ100	10	
R107	ERDS2SJ470	47	
R108	ERDS2FJ150	15	
R109	ERG1SJ470	47	
R121	PQ4R10XJ103	10k	
R122	PQ4R10XJ471	470	
R123	PQ4R10XJ182	1.8k	
R124	PQ4R10XJ181	180	
R125	PQ4R10XJ101	100	
R126	PQ4R10XJ562	5.6k	
R127	PQ4R10XJ222	2.2k	
R201	ERG1SJR33	0.33	
R202	ERD2STJ682	6.8k	
R204	ERD2STJ104	100k	
R221	PQ4R10XJ182	1.8k	
R222	PQ4R10XJ102	1k	
R223	PQ4R10XJ562	5.6k	
R224	PQ4R10XJ223	22k	
R225	PQ4R10XJ123	12k	
R227	PQ4R10XJ392	3.9k	
R228	PQ4R10XJ122	1.2k	
		(CAPACITORS)	
C101	ECQU2A104MV	0.1	⚠
C102	ECQU2A104MV	0.1	⚠
C103	PFKDE2GA102K	0.001	⚠
C104	PFKDE2GA102K	0.001	⚠
C105	ECKDNA222ME	0.0022	⚠
C106	PFCEA400S560	56P	
C107	ECKD3A470KBP	47P	
C108	ECKD3A102KBP	0.001	
C109	ECA1VHG470	47P	

Ref. No.	Part No.	Part Name & Description	Remarks
C110	ECKDNA222ME	0.0022	
C121	ECUV1H472KBN	0.0047	
C122	ECUV1C224KBX	0.22	
C123	ECUV1H561KBM	560P	
C124	ECUV1H473KBX	0.047	
C201	EEUFA1V471	470P	
C202	ECKD3A102KBP	0.001	
C203	ECQV1H104JZ	0.1	
C204	PQCEA10B1000	1000P	
C221	ECUV1E104KBW	0.1	
C223	ECUV1H271KBN	270P	
C224	ECUV1E104KBW	0.1	
		(FUSE)	
F101	PFBA215005	FUSE	⚠
F201	PFBA19372	FUSE	
		(OTHERS)	
L103	EXCELDR35	COMPONENTS PARTS	
RL201	PFSLDG24D1	RELAY	
TH101	PFRRTM8R207C	THERMISTOR	
T101	ETS29AE138A	TRANSFORMER	
VR201	EVNDJAA03B53	VARIABLE RESISTOR	⚠

14.6. CCD BOARD PARTS

Ref. No.	Part No.	Part Name & DescriptionCCD BOARD PARTS	Remarks
PCB5	PFWP2FP200M	CCD BOARD ASS´Y (RTL)	
		(ICs)	
IC801	PFWP2FP200M	CCD BOARD ASS´Y (RTL)	
		(TRANSISTORS)	
Q801	2SB1218A	TRANSISTOR(SI) (or 2SA1576R)	
Q802	2SB1218A	TRANSISTOR(SI) (or 2SA1576R)	
Q803	2SD1819A	TRANSISTOR(SI) (or 2SC4155S)	
		(CONNECTOR)	
CN801	PQJP8G30Y	CONNECTOR, 8P	
		(CAPACITORS)	
C801	PQCUV1E104MD	0.1	
C803	ECEA1CKS101	100	
C804	PQCUV1E104MD	0.1	
		(RESISTORS)	
J801	PQ4R18XJ000	0	

Ref. No.	Part No.	Part Name & DescriptionCCD BOARD PARTS	Remarks
J802	PQ4R10XJ000	0	
J803	PQ4R10XJ000	0	
R801	PQ4R10XJ202	2k	S
R802	PQ4R10XJ202	2k	S
R803	PQ4R10XJ100	10	S
R804	PQ4R10XJ242	2.4k	S
R805	PQ4R10XJ272	2.7k	S
R806	PQ4R10XJ242	2.4k	S
R807	PQ4R10XJ272	2.7k	S
R808	PQ4R10XJ471	470	S
R809	PQ4R10XJ471	470	S
R810	PQ4R10XJ681	680	S
R811	PQ4R10XJ101	100	S
R812	PQ4R10XJ101	100	S
R830	PQ4R10XJ000	0	S
		(VARIABLE RESISTOR)	
VR801	EVNDXAA03B23	SEMI-FIXED RESISTOR, 2k	

14.7. HOOK BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
		HOOK SWITCH AND SENSOR BOARD PARTS	
PCB6	PFLP1130MZ	HOOK SW/SENSOR BOARD ASS´Y (RTL)	
		(IC)	
IC401	PQVIBA12003	IC	S
IC402	PQVIBA12003	IC	S
		(TRANSISTOR)	
Q401	2SB1322	TRANSISTOR(SI) (or 2SB1237R)	S
Q402	2SB1322	TRANSISTOR(SI) (or 2SB1237R)	S
		(DIODES)	
D401	1SS147	DIODE(SI)	
D402	MA7200	DIODE(SI)	S
D403	1SS147	DIODE(SI)	
D404	MA7200	DIODE(SI)	S
		(CONNECTORS)	
CN401	PQJP5G30Y	CONNECTOR, 5P	
CN402	PQJP9G30Y	CONNECTOR, 9P	
CN403	PQJP09G100Z	CONNECTOR, 9P	
CN404	PQJP02G100Z	CONNECTOR, 2P	
CN405	PQJP5G30Y	CONNECTOR, 5P	
CN406	PQJP03G100Z	CONNECTOR, 3P	
CN407	PQJP3G30Y	CONNECTOR, 3P	
CN408	PQJP3G38Z	CONNECTOR, 3P	
		(CAPACITOR)	

Ref. No.	Part No.	Part Name & Description	Remarks
C401	ECEA1VKA220	22	
		(FUSE)	
F401	PQBA1N025NMA	FUSE	
		(PHOTO ELECTRIC TRANSDUCERS)	
PI401	CNA1006N	SENSOR	S
PI402	CNA1006N	SENSOR	S
PI403	PQVIPS4506	SENSOR	S
		(RESISTORS)	
R401	ERDS2TJ821	820	
R402	ERDS2TJ332	3.3K	
R403	ERDS2TJ821	820	
R404	ERDS2TJ332	3.3K	
		(SWITCH)	
SW401	ESE14A211	SWITCH, HOOK	

14.8. FIXTURES AND TOOLS

Ref. No.	Part No.	Part Name & Description	Remarks
		FIXTURES AND TOOLS	
EC1	PQZZ2K6Z	"EXTENSION CORD, 2P"	
EC2	PQZZ2K12Z	"EXTENSION CORD, 2P"	
EC3	PQZZ2K13Z	"EXTENSION CORD, 2P"	
EC4	PQZZ3K5Z	"EXTENSION CORD, 3P"	
EC5	PQZZ3K7Z	"EXTENSION CORD, 3P"	
EC6	PQZZ3K12Z	"EXTENSION CORD, 3P"	
EC7	PFZZ5K13Z	"EXTENSION CORD, 5P"	
EC8	PQZZ8K15Z	"EXTENSION CORD, 8P"	
EC9	PQZZ8K18Z	"EXTENSION CORD, 8P"	
EC10	PQZZ8K18Z	"EXTENSION CORD, 8P"	
EC11	PFZZ8K23Z	"EXTENSION CORD, 8P"	
EC12	PQZZ9K4Z	"EXTENSION CORD, 9P"	
EC13	PQZZ6K14Z	"EXTENSION CORD, 6P"	
EC14	PQZZ11K4Z	"EXTENSION CORD, 11P"	
EC15	PQZZ11K8Z	"EXTENSION CORD, 11P"	
EC16	PQZZ7K11Z	"EXTENSION CORD, 7P"	
	PFZZ1F780M	CCD TOOL (See 3 ADJUSTMENTS.)	
	PFZZFP200M	SENSOR BOARD TOOL	
		(See Ref. No. 6 in 4 DISASSEMBLY INSTRUCTIONS.)	
	PFZZFP320G	VOICE PROMPT ROM	
		(See FLASH MEMORY (IC509) in 2.3.3.4.1. Digital Board Section.	
	KM79811245C0	BASIC FACSIMILE TECHNIQUE	
		(for training service technicians)	

Note:

Tools and Extension Cords are useful for servicing.
(They make servicing easy.)

14.9. EXPLANATION OF CD-ROM SERVICE NUMBER

PFJ K 201 00 10 1
① ② ③ ④ ⑤

FD service number

PFJ F 202 00 10 B
① ② ③ ④ ⑤

PFJ F 203 00 10 1
① ② ③ ④ ⑤

1. Media (1 digit of alphabet)
K: CD-ROM
F: FD

1) Software classification (3 digits of alphanumeric letters)
Interface name (1 digit) + Software classification (2 digits)

Digits of software classification consists of 1 digit of interface name and 2 digits of software classification.
The classification number of software has its own signification according to the interface name.
*When new software classification code is appeared, the classification number is increased in order.

Interface name (1 digit of alphanumeric letter): 1 to Z

1: Serial Cable (RS-232C)
2: Parallel Cable (IEEE1284 printer cable)

Classification of software, OS number, Hardware (2 digits of alphanumeric letters): 00 to ZZ

1: Serial Cable
01: FM220/FM260/FM280, PC FAX software (Windows 3.1x/95)
02: FP300 series, PC FAX software (Windows 95/98)
2: Parallel Cable
01: FLM600 series, printer driver (Windows 3.1x/95/98)
TWAIN driver (Windows 3.1x/95/98)
PC FAX software (Windows 95/98)
02: FLM600 series, printer driver (Windows 95/98)
TWAIN driver (Windows 95/98)
PC FAX software (Windows 95/98)
03: FLM600 series, printer driver (Windows 3.1x)
TWAIN driver (Windows 3.1x)

Example: Parallel Cable (printer cable), FLM600/650 series
Printer driver (Windows 3.1x/95/98)
TWAIN driver (Windows 3.1x/95/98)
PC FAX software (Windows 95/98)
→ 201

2) Language (2 digits of alphanumeric letters): 00 to ZZ
Language number
· The letters from 0 to 9 are used when single language is supported. Start from 0.
When the right digit becomes full, the left digit counts up.
· The letters from A to Z are used when plural languages are supported. Start from A.
When the right digit becomes full, the left digit counts up.

Assignment table (As of June 7, 1999)
1) Single language

Language code	Language
00	English (U.S.A.)
01	English (U.K.)
02	French (France)
03	German
04	Italian
05	Portuguese
06	Spanish
07	French (Canada)
08	Polish
09	Finnish
0A	Russian
0B	Chinese
0C	English (Canada)

2) Plural languages

Language code	Language
A0	English (U.S.A.) + French (Canada)
A1	German + English (U.K.)
A2	German + English (U.K.) + Polish
A3	German + English (U.K.) + Polish + Portuguese + Spanish
A4	English (U.S.A.) + French (Canada) + German
A5	English (U.S.A.) + French (Canada) + German + English (U.K.) + Italian
A6	English (U.S.A.) + French (Canada) + German + English (U.K.) + Italian + Polish + French (France)
A7	English (U.S.A.) + French (Canada) + German + English (U.K.) + Italian + Polish + French (France) + Spanish + Portuguese

4) Version (2 digits of alphanumeric letters): 10 to ZZ
Version number
Example: Version 1.0
→ 10

5) Plural CD-ROM/FD serial numbers (1 digit of alphanumeric letter): 1 to Z
The number of media

1: Disk1	B: Disk11
2: Disk2	C: Disk12
3: Disk3	D: Disk13
4: Disk4	E: Disk14
5: Disk5	F: Disk15
6: Disk6	G: Disk16
7: Disk7	H: Disk17
8: Disk8	J : Disk18
9: Disk9	K: Disk19
A: Disk10	L: Disk20

Example: FD 11 media
→ C

Note: “I” and “O” of alphabet are not used not to be taken for “1” and “0” of number.